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VOL. II.—11TH YEAR. SYDNEY: SATURDAY, SEPTEMBER 13, 1924. No. 11.

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NOTES UPON TONSILS, ADENOIDS AND SOME MIDDLE EAR INFECTIONS IN CHILDHOOD.[1]

By WALTER CROSSE, F.R.C.S. (Edin.),

Assistant Surgeon to the Ear, Nose and Throat Department, Brisbane Hospital.

Diseases of the tonsils, adenoids and *otitis media* cause so much ill health, damage to hearing in later life and even fatal complications, that we must always be on the look-out for them. I have long been persuaded that no examination of a child is complete until the throat, nose and ears have been inspected.

Tonsils and Adenoids.

The fact that adenoids are always present when the tonsils are enlarged makes it convenient to consider these two conditions together.

Symptoms.

Adenoid facies and skeletal deformities, the result of mechanical obstruction, are so well known that I need not refer to them here except to remind you that we do now and again meet with children in whom the adenoid facies is pronounced who are not the subjects of adenoids. There are, for instance, the cases in which a crumpled and deflected septum obstructs both nostrils and the Mongol idiot whose open mouth and protruding tongue proclaim him what he is. On the other hand there are many children with adenoids who do not show the least sign of it in their faces. There are to be remembered also patients with the typical facies who owe it to having been operated upon too late.

In estimating the amount to which adenoids are obstructing a throat, we must not trust too much to the mother's account. A mother may say her child does not mouth-breathe or snore, yet on close obesrvation the child's lips may be seen to be slightly separated. Again, a child may only occasionally have to supplement his nasal respiration by mouth-breathing and as to snoring on which a good deal of stress is laid, although it is common, it is not by any means always present.

Sometimes the presence of adenoids in infants is revealed by the fact that the child has to leave off suckling to take a breath through the mouth. In such cases nursing at the breast, for instance, is difficult.

"Thick" speech, due to large tonsils obstructing the fauces or a "dead" voice, due to adenoids obstructing the upper resonating chambers, is not in my experience very common, but "thick" speech is met with especially when the tonsils nearly meet in the middle line or when the post-nasal growths are excessive.

[1] Read at a meeting of the Queensland Branch of the British Medical Association on July 4, 1924.

Vomiting or "choking fits" while eating are not uncommon. They, too, are caused by the nasal obstruction. Mastication without closing the lips is difficult and the mouth with food in it is scarcely suitable as an inspiratory tube. More or less choking is likely.

Hampered attempts to inspire air through the nose during sleep lead to restlessness, tumbling about and throwing off the bedclothes and these are common symptoms of adenoids. So, of course, the child wakes in the morning listless and peevish. Other symptoms due to imperfect oxygenation of the blood are dreaming, nightmare, night terrors, malnutrition, anæmia. Any of the above symptoms are signs which, when found in a child, should lead to careful examination of tonsils and adenoids and the latter will generally be found to be the main cause. Their removal improves the symptoms I have been mentioning, so that if the tonsils are not definitely diseased, they may be left in very young children. It is remarkable how tonsils, even though fairly large, will diminish in size after the removal of adenoids.

Frequent and constant colds in the head, snuffles, gummy mucus seen behind the soft palate and aural symptoms are suggestive of adenoids, so also epistaxis occasionally free, but sometimes merely enough to streak the nasal mucus, may direct attention to the presence of adenoids.

Aural symptoms are very frequent with these growths. It is near the truth to say that all deafness in children is due to their presence. At least their significance is extremely important and should receive prompt attention in every case. They should in fact receive more attention than they do. Parents and guardians too often mistake slight deafness for inattention on the part of the child, whereas the deafness which causes the inattention, is too frequently due to middle ear trouble, itself caused by adenoids. So inattention and deafness become important indications for careful examination. Examination in these cases almost always reveals retracted or congested drums. Any doubt upon the matter can be easily cleared up by digital examination of the posterior nares. It is not enough that the parent should state that tonsils and adenoids have been previously removed. Examination should still be carried out. The removal may have been incomplete. Of course though the post-nasal space may be found clear, the tonsils may require treatment. Persistent cough, especially at night, should lead to careful examination of both tonsils and adenoids. The cough often ceases after a thorough removal of both. Nevertheless we should be guarded as to prognosis about the result of operation and should always make careful examination of the chest.

Attacks of pyrexia are common in chronic or recurrent lacunar tonsillitis. Children with these complaints are frequently found with elevated temperatures, even though they may not complain of a sore throat. They are commonly very peevish and fretful, "pick" their food and as a result show evidence of malnutrition. Their mental and physical capacity are both under the average when compared with children of their own age. On examination of such children the tonsils may appear quite small, but may be of the buried type. Certainly if the tonsillar glands are found to be enlarged, removal of the tonsils will result in prompt benefit. The sickly child will become bright and active.

During the time I was in general practice I came across many patients of this type and I am now quite satisfied that complete removal of their tonsils was all they required to restore them to health. I lay emphasis on the word complete because I often see patients who continue with the above symptoms after one or more tonsillotomies. Enlarged tonsillar glands are usually a definite indication for removal of tonsils. The tonsillar gland is of all the cervical nodes one of the most constant in position. When enlarged it appears superficially from 1.25 to 1.8 centimetres (one half to three-quarters of an inch) below the angle of the jaw in front of the anterior border of the sterno-mastoid muscle. The tonsil is always the source of infection when this gland alone is enlarged. The most posterior of the submaxillary glands may be confounded with the tonsillar gland, but this is situated just under and anterior to the angle to the jaw and commonly becomes enlarged from disease of the teeth and gums. It should not be forgotten that the tubercle bacillus may gain admission to the gland through the diseased tonsil.

Complications and Sequelæ.

The close relation between rheumatism and the tonsil is so well established that I recommend enucleation as a routine when all other possible sources of infection have been investigated without any result. When the tonsil has apparently looked healthy, decomposing *débris* is often expressed from the depth of the crypts during tonsillectomy and after enucleation I have often observed small chronic abscesses through the capsule.

Not long ago I had a little girl sent to me who was suffering from rheumatism with fluid in the wrist, elbow, knee and ankle joints. She had large tonsils with chronic follicular tonsillitis. The joint conditions cleared up completely and promptly after their removal. She became a bonny healthy child and has had no recurrence, although it is now nearly two years since the operation. I could cite similar results in several rheumatic children, particularly those affected by the growing pain type. Nephritis is another disease in which I recommend enucleation. Many patients benefit and even if they do not, no harm is done by removing the tonsils. Reflex neuroses such as convulsions, nocturnal incontinence, stammering, hay fever, asthma and *laryngismus stridulus* have been attributed to tonsils and adenoids. I recently had a little patient who stammered, sent to me for operation for tonsils and adenoids. This stammering greatly improved after operation, but I have had others who were no better for that treatment. The result of operation in nocturnal incontinence is very disappointing; therefore we should not promise too much in this condition.

Lastly there is to be considered the apparently perfectly healthy child with enlarged tonsils and

no complaints whose condition is only discovered by a chance examination of the throat. As their presence exposes the child to many risks before involution takes place, they are better removed. I should mention here that in examining tonsils a mere glance is useless, as by this method a pedunculated tonsil is probably the only type that would attract attention. The buried tonsil has a broad base attached to the tonsillar sinus, the superior lobe of which may be and often is entirely hidden by the pillars. The buried tonsil may not appear internally beyond the pillars of the fauces. A mere glance, therefore, would give no indication of its size. The size is only appreciated when it is thrown inwards by the superior constrictor muscle of the pharynx and the deeper parts are thrown into relief by the tense palatal muscles during gagging. The buried tonsil often extends externally far beyond the pillars. This type of tonsil is often the largest. If you examine the specimens we have here to-night, you will find the majority are of this type, in fact in many of them the capsular portion appears to be the entire tonsil. The crypts of the tonsil and the supratonsillar fossa should be examined by gentle pressure on the anterior pillar. Thus any abnormal secretion may be revealed.

I ask you to consider the question of complete removal carefully. Often after incomplete removal the patient has to submit to a further operation before any real benefit results. The question frequently arises: "Will the tonsils grow again?" It is safer to answer in the negative after a thorough and complete enucleation! The same may be said of adenoids in older children, but in the very young, even after a thorough operation, there is a possibility of return in a small percentage. Many will also question you regarding the function of the tonsil. Many theories as to the function of the tonsil have been advanced, but none so far definitely proved.

The gland is composed of lymphoid tissue, histologically identical with that of the other lymphoid nodules of the respiratory and alimentary tracts. The tonsil differs from these only in its size, compactness and the number and complexity of its crypts. Its functions, therefore, must be practically identical and it is amply compensated for after complete removal. Up to the age of puberty the tonsils should be respected as functionating organs. When diseased any function they might have once possessed is lost. Instead of being of any use they then become an ideal culture bed for organisms and a ready portal for infection after puberty. As far as I know, no ill effects have been reported following complete removal of these glands, although countless tonsillectomies must have been performed all over the world during the past few years. On the other hand there is abundant proof of the good results which follow their complete removal. Do not understand me to advocate the indiscriminate removal of tonsils. Many tonsillar attacks with enlargement which suggest operative interference when first seen, completely clear up, leaving the tonsil again normal. When on the staff of the Children's Hospital I found that by the time some of these patients presented themselves for operation, their tonsilitis had completely resolved.

Method of Performing the Operation of Enucleation.

I personally prefer in children to enucleate the entire tonsil with the instrument known as a guillotine. There are numerous patterns on the market to choose from. I prefer either a Mackenzie's or a Ballanger which has scissor-like handles. The essential features are, I think, that the blade of the guillotine should not be very sharp. It should crush rather than cut. The shaft should be strong and inflexible, the ring should be rather smaller than the tonsil you are to remove and the handle set at an obtuse angle to the shaft. The adenoid curette may have either a square or oblong fenestrum not an ovoid one and should be very sharp. I prefer one without the hooked guard. The Laforce adenotome is an instrument preferred by some operators.

I use ethyl chloride anæsthesia as a routine in children. It gives a sufficiently long anæsthesia for removal of both tonsils and adenoids, the operation being usually completed in thirty to forty seconds. The child soon regains consciousness and is able to help himself to clear his throat. Therefore the risk of any blood entering into the lower air passage is reduced to a minimum. For beginners I would strongly recommend the use of a longer anæsthetic. The gag should be introduced into the mouth on the left side before the patient is anæsthetized. The best gag to use is Doyen's. The operator should stand on the right side of the patient, and take the right tonsil first. The guillotine should be introduced into the mouth like a tongue depresser. The ring of the guillotine is then carried down to the lateral wall of the pharynx facing the tonsil. The point of the instrument is then well dug in below and behind the tonsil and the lower pole threaded through. At the same time the tonsil is levered forward by bringing the handle over towards the opposite angle of the mouth and the tonsil is made to produce a swelling just above and external to the anterior pillar, its appearance being similar to that of a peritonsillar abscess. The swelling corresponds to the upper pole of the tonsil. By pressing firmly upon it with the left thumb or forefinger the entire tonsil is forced through the ring of the guillotine and should be held there till the blade is driven home. The instrument is then sharply turned upwards and inwards, bringing the lower surface uppermost, and withdrawn with the tonsil attached. The left tonsil should be removed in the same manner, the operator's position being altered to the head of the table.

Method of Removing Adenoids.

Having disposed of the tonsils, we proceed next to remove the adenoids; the patient is now turned on his left side with his face over the side of the table face downwards. The operator, standing at the head of the table, should hold the adenoid curette like a fork, the forefinger resting on the back of the shaft. This in my experience gives freer wrist movement than holding the instrument like a daggar, as generally recommended. The operator also is less likely to bear too heavily on the instrument and thus there is less risk of tearing the mucous membrane. The instrument should be introduced behind the soft palate and carried upwards in the

middle line until it touches the posterior border of the septum. The curette should be then gently shaken from side to side while it is pushed upwards and backwards to assist the growth to fall into the ring. Then a definite downward sweep of the curette should be made which describes half a circle. For this a movement of the wrist only should be employed. This method, properly performed, will shave off the growth *en masse*. The curette should then be reintroduced and any remaining growth on either side of the main mass removed in the same manner. Care must be taken in this not to injure the Eustachian cushion. The post-nasal space should be shaved, not curetted. The finger is then introduced to see that all is clear, including the fossa of Rosenmüller. Before the patient is returned to bed the operator should satisfy himself that all hæmorrhage is arrested. Hæmorrhage is rare in children, but occasionally bleeding does take place. You may suspect hæmorrhage if the child is constantly spitting up bright red blood and at the same time becoming pale and collapsed. Patients often become pale and faint prior to vomiting blood that has been swallowed during the operation, but this is dark in colour and need cause no alarm. The colour improves immediately after this vomiting. Should hæmorrhage occur, remove all clots from the tonsillar sinus and if a bleeding point is seen (it is generally found in the upper outer wall of the sinus), it should be clamped and a ligature applied if necessary. If it is only a general oozing, firm pressure with a sponge soaked in peroxide of hydrogen and held for some minutes will generally check it. "Hæmostatic serum" should be given.

After Treatment.

After-treatment consists in rest in bed for two days. Little or no food should be given the first day, but sips of sterile water. An aperient, such as calomel, should be given the next day and semi-fluid diet. Attention should also be paid to oral hygiene, with some disinfectant lotion and attention to teeth. As soon as the bowels have been opened, the patient may return gradually to normal diet. The patient should be brought back in a few days for inspection, as adenoid tags may require removal. It is best to avoid milk for a few days.

Otitis Media.

So much for diseases of tonsils and adenoids. Let us now consider *otitis media*.

Middle ear affections are frequent in infancy and childhood and often lead later to permanent and irreparable damage to hearing and sometimes to dangerous and even fatal complications. This frequency is mainly due to the influence of tonsil-adenoid disease, the greater susceptibility of children to infectious diseases and in infants to the shorter, wider and more horizontal Eustachian tube which favours infection of the middle ear from the naso-pharynx. Tubal catarrh in children is often overlooked and neglected, so that the child may not be brought to us until the loss of hearing becomes apparent. This is the type most often seen in children suffering from tonsil-adenoid disease, to which I referred in dealing with adenoids. It is due to the mechanical effects produced by a narrowing or closure of the pharyngeal end of the Eustachian tube by inflammation and swelling. As the mucous membrane of the middle ear absorbs air the air pressure within the middle ear becomes negative and the tympanic membrane is retracted or forced in by the air pressure from without. Examination of the ears will now show a greatly retracted drum, with no other structural changes. Now should the tube become closed by further inflammation and swelling, the absorption of air continuing causes an even greater negative pressure with hyperæmia of the mucous membrane of the middle ear and a flow of serum into the tympanic cavity. An examination of the drum will now reveal a greatly retracted tympanic membrane, pink in colour and the blood vessels, especially round the hammer handle, will be found injected. At this stage slight ear ache may occur, but is never severe. These attacks generally subside, but when they recur frequently are apt to lead to permanent changes in the mucous membrane or become chronic. I feel sure they are responsible for much of the catarrhal deafness in adults. The removal of tonsils and adenoids will put a stop to them. If the deafness should persist, recourse should be had to inflation by Politzer's method to restore inter-tympanic pressure.

Acute suppurative *otitis media* is simply a further stage of the above. The serum in the tympanic cavity becomes infected with micro-organisms. In the majority of cases of acute suppurative *otitis media* the fever and subjective symptoms are considerable. In a minority, particularly in infants and young children, they are often very indefinite. It is therefore of the utmost importance in children and infants to examine the ears when no other cause for an increase in temperature is to be found.

In children with infectious diseases, the exanthemata for example, the ear should be examined as a routine. Otitis in such cases is often masked by the initial disease and may not be discovered until the drum ruptures and a discharge appears in the meatus. Unaccountable rises of temperature during a fever or pneumonia are often due to otitis. It is easy to overlook *otitis media* in children unless you are constantly on the look-out for it.

In infants and young children the symptoms are apt to be obscure, shown only by restlessness and sleeplessness at night, continuous crying, rolling the head from side to side or grabbing at the ears. Occasionally the appearance of head retraction, vomiting and convulsions may lead you to suspect meningitis, until inspection of the drum reveals the nature of the condition and with prompt incision of the membrane the symptoms clear up. In the average case perforation takes place within a few hours or in one or two days and is followed by relief from all symptoms. The discharge is at first thin, serous and profuse, but later generally becomes thick and mucoid. If the ear is kept clean, it generally becomes dry within three weeks in uncomplicated cases.

Mastoiditis is not common in infants. The mastoid process does not exist during the first few months of infant life, but the antrum is relatively large and is well drained by a roomy aditus. It has a thin outer wall close to the surface of the skull and lies higher in relation to the middle ear than

the adult antrum. When mastoiditis (strictly we should say antritis) does occur, it usually shows itself in the form of a sub-periosteal abscess, due to the breaking down of the thin outer wall of the antrum. The swelling is therefore in the region of the antrum, that is above and behind the ear. It leads to a good deal of downward and forward misplacement of the auricle.

In older children with otitis the symptoms are as a rule more pronounced. Pain is severe and the onset more or less sudden. The temperature is usually high, from 38.9° C. to 40.5° C. (102° F. to 105° F.). The mastoid process more nearly approaches the adult type. It is often sensitive to pressure during the acute stage of the otitis. If untreated, the drum usually ruptures within six to twenty-four hours with prompt relief of all symptoms. At the commencement the discharge is usually serous and profuse, but later becomes thick and muco-purulent. Under proper treatment it gradually subsides and within a few days to six weeks disappears. In other cases which do not go on to resolution, the infection may extend and the mastoid process may become involved. If untreated perforation of the mastoid cortex with sub-periosteal abscess, lateral sinus infection, meningitis or brain abscess may supervene.

When the rise in temperature persists after rupture or incision of the drum, the possibility of any of the above complications becomes a matter for careful consideration.

Treatment.

When a diagnosis of otitis is made and the drum is found to be congested, but not bulging, conservative treatment should be tried. The bowels should be opened, hot dry applications applied and glycerinated carbolic acid drops instilled into the meatus. The drops consist of seven cubic centimetres (two fluid drachms) of glycerinated carbolic acid made up to twenty-eight cubic centimetres (one fluid ounce) with glycerine. If the symptoms do not clear up and the drum again is found to bulge, recourse should be had at once to incision of the drum membrane. As this operation is exceedingly painful, a general anæsthetic should be given. I always give ethyl chloride, but everything must be in readiness before the administration of the anæsthetic is commenced. The meatus should be syringed out first with either a one in two hundred solution of carbolic acid or one in four thousand solution of bi-chloride of mercury and mopped dry with sterile wool wound on a suitable applicator. Incision should be made in the posterior part of the drum and carried from below upwards. A mere puncture is not sufficient. It does not give adequate drainage and it tends to close prematurely. Pus or serum may appear at once, on the other hand the flow may not be established for a day or two.

Immediately following the incision the ear should be douched with warm saline solution to prevent the formation of a post-operative clot which may block the canal.

During the first few days after the operation the ear should be gently syringed with warm saline solution at frequent intervals, that is as often as required to keep the canal free from pus, generally every three to four hours will be found sufficient. Later I prefer cleansing the ear by the use of mops. First mop the meatus dry; then drop in a little hydrogen peroxide and repeat the mopping until dry again. Equal parts of peroxide and spirit are often useful. Every precaution should be taken to prevent the entrance of organisms from without and to encourage free drainage.

Chronic Suppurative Otitis Media.

Chronic suppurative otitis although a most important disease, frequently goes untreated. It is a fruitful source of ill-health, a constant menace to life and hearing. It surely commands very much more attention than it usually receives.

The treatment consists first in removal of adenoids or diseased tonsils, if present. Aural polypi damming back discharge should also be removed. Systematic cleansing and antiseptic treatment should then be carried out daily. I prefer to mop the meatus until dry. Then instil a few drops of hydrogen peroxide. After waiting five of six minutes I usually mop the meatus dry again and instil a few drops of rectified spirits and boracic acid (0.48 gramme or eight grains of boracic acid in twenty-eight cubic centimetres or one fluid ounce of rectified spirits). After that I place a piece of cotton wool loosely in the meatus. Occasionally gentle syringing is useful to remove flakes, but this should not be entrusted to the parent. If after two or three months careful cleansing fails to cure the condition, the conservative mastoid operation should be done, except in carefully selected cases, such as cholesteatoma *et cetera* for which a radical mastoid operation would be indicated.

To go into the details of these operations would require a paper in itself, but shortly, the conservative operation consists in throwing open the mastoid antrum and cells, the removal of the greater part of the posterior meatal wall and the construction of a meatal flap through which to dress the wound. In this operation ossicles and tympanic membrane are preserved. The operation is based upon the theory that irritating fluid products of the diseased antrum constantly flowing through the aditus into the tympanum perpetuate the suppurative process in the middle ear and that if this source of irritation is removed, the tympanic lesion will undergo a cure.

SOME EYE NOTES FOR THE GENERAL PRACTITIONER

By GEORGE THOMSON, M.B., Ch.B. (Aberd.),
Senior Eye-Surgeon, Brisbane General Hospital.

ON being asked to read a paper before you tonight, I accepted the invitation with great diffidence, as I found it very difficult to decide upon a subject that would be of real interest to you. After some deliberation and upon advice I came to the con-

[1] Read at a meeting of the Queensland Branch of the British Medical Association on July 4, 1924.

clusion that I could not do better than to discuss a few of the phases of eye-work that are more or less familiar to the general practitioner and so refresh your memories on some points which you might quite easily and excusably overlook or forget in the multitude of diverse problems that go to make up your daily round. My treatment of the subject will be of the simplest nature and I am afraid I have nothing new or original to offer you, but I hope that the few remarks I am going to make may be sufficiently practical to interest you and, if you derive a measure of benefit from them, I shall be more than rewarded for my labour.

Trachoma.

I have been very forcibly struck since coming to Queensland with the extreme prevalence of trachoma in this part of the world. In the western parts of the State the percentage of individuals who do not demonstrate some degree of trachoma in the acute or chronic form, must be very small indeed and this dreadful malady with its ghastly sequelæ must be considered one of the scourges of the State. Thanks to the national system of medical examination of all school children this disease is being recognized in the young in its earliest stages and as a result of prompt and thorough measures it is possible that we may one day succeed in eradicating from our midst this prolific source of blindness. In the city the general practitioner must see many cases of trachoma in the course of his work and in many early instances of mild affection he ought to be able to treat the condition successfully. The diagnosis is usually easy and I would like here to impress the necessity of a routine examination of the conjunctiva, both bulbar and palpebral, in all eye affections of whatever nature. In the differential diagnosis the disease most likely to be confounded with trachoma is the comparatively benign follicular conjunctivitis which affects mostly children and young adults and is characterized by the formation of round translucent bodies situated in the majority of instances in the lower fornix, but sometimes also implicating the upper fornix. They practically never involve the tarsal surface of the lids and unlike the "trachoma bodies" they show a great tendency to a definite arrangement in more or less parallel rows. Follicular conjunctivitis is in many children a manifestation of a reduced general resistance and is often associated with adenoids. It is very definitely not contagious and the prognosis, even with little or no local treatment, is good. An examination of the throat and accessory sinuses is indicated in every case and a correction of any refractive error that exists. Trachoma presents a vastly different proposition with its dreaded complications of pannus formation, corneal ulceration, scarring and distortion of the lids and its high degree of contagion. Although it may be occasionally very difficult to differentiate between trachoma and follicular conjunctivitis, there are some points that make the diagnosis in most cases perfectly clear. While follicular conjunctivitis represents merely an enlargement of the lymph follicles, trachoma is characterized by a true hypertrophy of the tarsal conjunctiva which appears red and velvety and by the presence of coarse granulations which appear through the superficial layers of the conjunctiva as grey translucent bodies not unlike grains of boiled sago. These are usually scattered irregularly over the conjunctival surfaces of the lids and while the tarsal conjunctiva may be studded with them we usually find on double eversion of the upper lid that by far the greatest numbers are situated in the upper retro-tarsal fold. The subjective symptoms are a burning or itching sensation in the eyes with redness and watering, especially after prolonged close work, with a certain amount of photophobia. Some patients with only a mild affection may present no symptoms other than a feeling of heaviness in the eyes after reading. The treatment of mild cases seen in the early stages consists in daily painting of the everted lids with silver nitrate solution (2% to 5%), followed by irrigation with one in four thousand solution of corrosive sublimate; this will usually effect a cure in a few weeks. The more advanced or chronic cases with definite hypertrophy of the conjunctiva and innumerable well-marked granulations are best treated by expression of the "trachoma bodies" followed by frequent brushing with 2% silver nitrate solution and irrigation with corrosive sublimate or boracic lotion. The treatment must be thorough, every millimetre of the lids being exposed. I always employ Knapp's roller forceps and have found the results uniformly good with this form of treatment. In the presence of pannus with corneal ulceration the use of atropine is indicated. Excision of the tarsal cartilage is advocated by some especially in the presence of threatened pannus formation. The therapeutic value of direct sunlight is being more and more recognized and availed of in the treatment of various affections of the body and many successes are reported as the result of its use in trachoma. The sun's rays are condensed by means of a lens on to the follicles for a few seconds each day. The treatment is painful and the use of cocaine is necessary. In the treatment of trachoma, especially if there is a super-added infection as evidenced by increased secretion, the eyes must never be bandaged and strict instructions must be given to patients with regard to the use of handkerchiefs, towels and articles of toilet generally. Relapses of trachoma are unfortunately not uncommon and the period of treatment may run into months or even years and many are never cured. The more numerous the remedies are for any particular disease, the less likely is any of them to afford a cure and so in dealing with trachoma the suggested remedies for which are many and varied, we are still looking hopefully for what we may term a definite cure. Our real hope, I think, lies in prevention and to this end the formation of an Anti-trachoma League in Queensland similar to those of France, Switzerland and other European countries, would be a very material forward move.

Corneal Ulcer.

There are many corneal conditions for which the family physician will be consulted first, and with which he may quite easily and competently deal. The commonest corneal lesion is the ulcer. This may

be the result of an infected corneal abrasion or it may be the result of direct bacterial action on an otherwise healthy cornea, the gonococcus and the diphtheria bacillus being particularly virulent in this direction and having the power to eat into the normal corneal epithelium. Any condition which leads to a drying of the surface of the cornea, will render it particularly susceptible to invasion and in this connexion a word of warning is indicated in the use of cocaine and other local anæsthetics. As the reflex act of winking in abolished by the instillation of cocaine into the conjunctival sac, the epithelium of the cornea, if the eyelids are not kept closed between the instillations, becomes dull and dry and may very easily desquamate. It is therefore a golden rule to refrain from prescribing cocaine solutions for patients who are not under direct supervision. The diagnosis of corneal ulceration presents no difficulty and can be readily made on account of the attendant symptoms of pain, photophobia and conjunctival hyperæmia. In severe cases where the toxins which filter through into the anterior chamber, set up an intense iritic reaction, we may get an aggregation of leucocytes at the bottom of the aqueous humour which have been poured out by the vessels of the iris and ciliary body and have gravitated to the depths of the anterior chamber, forming what we call a hypopyon. The term hypopyon is misleading as the fluid, when tapped, is invariably sterile. Small hypopyons clear up as soon as the ulcerative process stops; larger accumulations may require to be tapped. The treatment of corneal ulcers consists in irrigating the conjunctival sac with a mild antiseptic lotion—usually boracic lotion—three or four times a day, the application of fomentations every two to four hours, the instillation of atropine (1% or 2% solution) every few hours and the application of a protective bandage. On the discovery of any corneal lesion it is very essential to instil atropine as a first step, as not only does it "splint" the iris and ciliary body and put them at rest, but by the dilatation of the pupil it prevents the possible formations of iris adhesions to the lens capsule—a dangerous sequela. The above treatment will usually result in a cure of the milder infections, but more drastic treatment is required for the rapidly progressive virulent conditions, more especially when there is deep implication of the cornea with possibility of perforation. Such ulcers may require the application of the actual cautery, particularly the type of ulcer known as the serpiginous ulcer, of pneumococcal origin and often secondary to a suppurative sac condition. This ulcer, unless checked early, spreads rapidly across the cornea and leads to very serious impairment of vision. I have obtained very gratifying results in the treatment of rapidly extending corneal ulcers by subconjunctival injection of two cubic centimetres of cyanide of mercury, combined with sodium chloride, cocaine, 'Dionin" and morphine. The immediate reaction is somewhat alarming, but the results in the cases I have treated by this method have been particularly good. There has been a rapid cessation of pain, a quick commencement of the healing process and a minimal amount of corneal scarring.

Vaccine therapy has been tried by some in the treatment of corneal ulcers, but I consider its usefulness in this field of medicine is very limited, although when the organism or strain of organisms at work can be demonstrated, it seems only rational that the production of a specific antibody should be the line of treatment. Some eye surgeons report wonderful results in the treatment of corneal conditions from the intra-muscular injection of sterilized milk, the *modus operandi* being apparently the production of an active aspecific immunization. The removal of a discovered septic focus in the teeth, tonsils or other neighbouring structures may lead to the arresting of a suppurative corneal process.

Iritis.

If a patient walks into your surgery with one eye bandaged up, complaining of severe pain radiating round the orbit and extreme photophobia and an examination shows a considerably injected conjunctiva, an iris that looks muddy with a contracted pupil that does not react quickly to light, you know that you are dealing with a case of iritis. Whether it be iritis or irido-cyclitis matters nothing, as I consider that the difference between the two diseases is one of name only and that the iris and the ciliary body are so associated that disease of the one without implication of the other is impossible. The pain of an iritis is typically of a neuralgic nature and when the other classic symptoms are more or less obscure, the nature of the pain will often lead to a correct diagnosis. If a doubt exists as to whether you are dealing with a superficial conjunctivitis or a deep ciliary injection a few drops of adrenalin in the conjunctival sac will usually clear up the diagnosis as it quickly dispels all the superficial conjunctival hyperæmia, but leaves the deeper seated vessels unaffected. Iritis is usually the result of an endogenous infection and we are inclined to tabulate the majority of cases as rheumatic, especially when we cannot demonstrate a definite toxin. Syphilis and gonorrhœa claim their shares and any of the acute febrile conditions may set up an inflammatory process on the iris and ciliary body. The teeth, tonsils and accessory sinuses may be foci of infection. Atropine (1% or 2% solution) at two or three hourly intervals, bandaging, light diet, calomel in doses of 0.0075 gramme (one-eighth of a grain) every few hours and complete rest in bed will in most cases effect a cure in from four to six weeks. Salicylates are useful adjuncts and when a reaction to the Wassermann test is elicited, anti-specific measures are indicated. When a possible focus of infection can be demonstrated, treatment must be directed against it. "Dionin" is a very useful drug in allaying the pain of an intense iritis. The one point in the treatment that the general practitioner should note particularly is the immediate instillation of atropine as soon as the diagnosis is made and its continuation until some considerable time after all the inflammatory symptoms have subsided.

Acute Glaucoma.

The one disease with which one must not confound iritis, is acute glaucoma. In some cases of irido-cyclitis there may be an early rise of tension which

though always slight, may be misleading. The condition of the pupil will then decide the diagnosis, being contracted and sluggish in iritis and dilated and reactionless in acute glaucoma. Atropine in glaucoma would lead to disaster, as would eserine in a case of iritis.

The diagnosis of a case of acute glaucoma should not present many difficulties. This disease, while by no means rare, is not nearly so common in this part of the world as in many other countries, particularly India and Egypt. I had a patient passed on to me recently by a practitioner of long standing and wide experience of general practice in this city who assured me that the patient in question was the first that he had seen suffering from glaucoma and diagnosed in his practice. The disease is not so rare as one might surmise from that remark and in its acute form presents a typical picture. The eye is definitely injected, the pupil is fixed in a position of semi-dilatation and it presents a sea-green lustre, the anterior chamber is usually shallower than normal, the tension of the eye is raised, the patient complains of excruciating pain radiating from the orbit to the temple and sometimes referred to the teeth and in particularly acute forms there may be vomiting with repeated rigors and elevated temperature and all the signs of a severe toxæmia with complete prostration. The vision of the eye during an attack is usually reduced to mere perception of light. The family physician will often be the first to be called in to a patient with acute glaucoma and prompt treatment is called for. The medicinal treatment consists in hourly instillations of eserine in 0.25% to 0.5% solutions, the frequent use of fomentations, rapid diaphoresis, free purging and absolute rest in bed. Morphine is invaluable in relieving the pain. If these measures do not succeed in allaying the symptoms, a useful emergency operation is that of posterior sclerotomy, performed by plunging a narrow von Graefe knife into the vitreous chamber at a spot well clear of the ciliary body; this results in an immediate fall in thte tension. When the acute symptoms have subsided, the question of a permanent cure must be considered. The condition of glaucoma may be secondary to some local mechanical obstruction to the normal passage of the ciliary secretion, as in the case of a dislocated lens, an intra-ocular tumour, perforation of the cornea with iris entanglement or complete occlusion of the pupil by iritic adhesions to the lens capsule. The treatment in such cases is aimed at the underlying cause. Again glaucoma may be a primary manifestation, the ætiology of which is a great bone of contention amongst eye surgeons. It is beyond the scope of this paper to discuss the various theories, but the one fact that stands out, is that the essential factor in the production of increased tension in the eye is a blocking of the angle of the anterior chamber and consequent prevention of a free drainage of the aqueous. Many operations have been devised to overcome this, the aim of the surgeon being to produce a permanently filtering scar. I have found the best results in my practice from sclero-corneal trephining, when a disc of half sclera and half cornea is removed at the sclero-corneal junction and a permanent opening is left for sub-conjunctival drainage. I always use a two millimetre trephine. There is a phase of glaucoma which might very easily mislead the man in general practice, namely the chronic simple type which never reaches an acute stage, but continues relentlessly to excavate the optic nerve head and, if untreated, terminates in complete and incurable blindness. The symptoms that lead to a diagnosis of this condition are a progressive fall in central visual acuity, a characteristic, though not constant, nasal contraction of the field of vision, precipitous cupping of the optic disc and increased tension of the eye. Though the increased tension may not be appreciable to the fingers, it is usually definitely demonstrated by the tonometer.

An early diagnosis of this condition is essential if the patient is to retain any measure of useful vision. I advise sclero-corneal trephining in every case as soon as the diagnosis is established. I consider that the continuous use of eserine in such cases is a mere dallying with a very dangerous condition. As there is undoubtedly a large systemic element in the production of primary glaucoma, treatment on general principles must supplement the local treatment and particular attention must be paid to the alimentary and cardio-vascular systems.

Cataract.

The diagnosis of cataract will in the vast majority of cases present no difficulty to you, although I have examined more than one patient labelled "cataract" who presented no opacity in either lens. This mistake, I think, arises from the fact that many pupils in senile patients present on direct illumination a greyish appearance not at all unlike that of a ripening cataract and hence misleading to the busy general practitioner who may not have the opportunity of calling his ophthalmoscope into play. With the ophthalmoscope there is no difficulty whatever in determining the presence of lenticular opacities. They stand out blackly defined against the red background of the fundus reflex in immature cases and completely occlude the fundal glow in advanced cases. One aspect of the treatment of cataract which ought to be given more attention than is usually assigned to it, is the mental attitude of the patient towards the operation and its results. Here the family physician can be of great service both to his patient and to the surgeon who performs the operation. Many a patient has been dissatisfied with the result of a perfectly successful cataract extraction, simply because he or she had been expecting too much. Patients should be well warned before submitting to operation of the risks that attend it, with the chance of a complete non-success as far as vision is concerned or even loss of the eye and further they should have impressed up them the fact that a perfectly successful operation is not going to give them the sight that they had before developing the cataract. It is true that a patient may be given $^{6}/_{6}$ vision, but a $^{6}/_{6}$ aphakic eye is a vastly different proposition from a $^{6}/_{6}$ normal eye. As the great majority of cataract operations result in vision ranging from $^{6}/_{60}$ to $^{6}/_{9}$ we cannot be too careful in preparing our patients for such results

and thereby saving them considerable mental anguish and bitter disappointment. Fortunately the precentage that come under that category is not large, but I think it could be reduced to a minimum if we paid a little more attention to the psychology of cataract extraction. The family physician will be very often asked for his advice on the question of operative interference in cataract particularly with reference to the time of operation. There is a tendency among some eye-surgeons to remove lenses that are not mature, that is when the lens is not completely opacified and the patient still retains a measure of sight. This procedure, except when intra-capsular operation is performed or in the few exceptional cases in which the cataractous processes have started simultaneously and progressed at a similar rate in both lenses, is, I consider, unjustifiable and one that entails greater risk to our patient than we are entitled to take. The severe iritis which often follows the presence of retained lens matter, becomes a very real menace to the eye in the presence of the excessive amount of cortex that must of necessity be left when an immature lens is removed through an opened capsule. It precludes any attempt at needling for several months after the original operation, while it certainly makes repeated needlings a considerable undertaking. The question of the choice of operation is an evergreen source of discussion amongst ophthalmologists. There is no doubt that intra-capsular extraction, that is removing the lens complete in its capsule, is the ideal operation when it is successful, but the risk with this operation of vitreous loss is so great that few surgeons outside India employ it as a routine method. The absolute necessity of having a skilled assistant to control the lids is also a disadvantage. I think that in selected cases this operation is ideal and should in many cases be attempted, as we can always resort to the capsulotomy operation if it is felt that the lens ligament is too resistant. Of the removal of the lens by the suction method—Barraquer's operation—I have no experience, but those who perform it, report excellent results. I personally find that the safest operation as a routine method in my hands is the capsulotomy operation through a normal pupil, with or without a small peripheral iridectomy.

Strabismus.

The family physician will often be consulted by patients demonstrating the condition of strabismus or squint. I intend to refer here to concomitant squint only, not to the condition of deviation produced by paralysis of a single muscle or group of muscles. The exact ætiology of concomitant squint is still unsolved and our treatment of this affection in the adult, even with the best of modern operations, must be considered uncertain, unscientific and certainly non-curative. We may by advancements, tenotomies, tendon-tuckings and so forth produce an almost perfect cosmetic result, with parallelism of the visual axes, but we are by these operations attacking merely one of the most obvious and distressing symptoms of the malady and we cannot thereby effect a cure, that is we cannot produce binocular single vision. In the child conditions are somewhat different and we may be able to produce an absolute cure if we get the patient young enough. I think most eye surgeons are agreed that one of the most important factors in the production of a squint is a mal-development of the fusion faculty. The fusion centre which effects and controls the blending of the images received by each eye into one complete picture, continues to develope from soon after birth until the age of six years. After that there is no further development. If during the early years of life the images received by the retinæ are by reason of ametropia or opacities in the media unequally distinct, then the brain in the presence of a weak fusion sense is liable to take cognizance of the clearer image only and the eye that shows the higher refractive error, is allowed to deviate. If by a proper correction of the eyes with glasses we produce a clear image in each eye, then we may hope to help the fusion centre to perform its work competently and develope along normal lines. Thus by the aid of glasses alone we can in some squinting children produce simultaneous macular perception with complete fusion. I always make a point of giving my young patients twelve months in which to try and overcome their squint by the wearing of glasses and if at the end of that period the squint still exists, I supplement the treatment with operation—tenotomy or advancement as indicated—and continue with the glasses. The one point I would wish to make clear is this, that it is in the best interests of your child patient to have its squint thoroughly investigated at the earliest possible date. Above all never advise the mother, as is sometimes done, to wait and see if the child will grow out of it. I have had patients from six months old upwards wearing glasses and wearing them with apparently complete comfort and certainly with marked benefit in the great majority of cases.

Lesions of the Lids.

Styes, marginal blepharitis, lids that are glued together in the mornings are all conditions that may bring a patient to his family doctor and while they may be purely local conditions and respond quickly to treatment with zinc or silver salts or mercurial ointments, they may prove very intractable and in such cases some deeper seated trouble would be suspected. The first possibility we think of is an uncorrected refractive error, particularly in the presence of headaches and if the patient's occupation entails much close work, such as in reading or writing. Statistics go to show that of all headaches 40% are of ocular origins. Frontal and temporal headaches that are brought on or aggravated by reading or in the case of our lady patients, sewing, suggest eye-strain, while occipital headaches with stiffening of the neck muscles are more likely to be ocular than from any other source, particularly if they appear late in the day. Occipital headaches strongly suggest an error of muscle balance and, unlike many eye surgeons, I consider that the headache that appears on awakening in the morning, may very possibly be the result of a muscle imbalance, particularly when the patient has not had complete muscular relaxation in sleep. The effects of

an uncorrected refractive error may be sufficient to produce such reflex condition as chronic dyspepsia, constipation, insomnia, irritability with uncertainty of temper, loss of power of concentration; in fact, one expert refractionist who has written a text-book on the subject, would make refractive errors possible causative agents for nearly "all the ills the flesh is heir to." (He affirms that he cured a patient who had toothache, with glasses.) Be that as it may, there is no doubt that with the advance of civilization and the amount of keen competition that is entering into every sphere of life, eye-strain plays a very important part in the day's work. The man with an uncorrected refractive error cannot with impunity do such satisfactory work as the man with correctly prescribed glasses. As there are very few emmetropic eyes in the world, it might be imagined that I was advocating glasses for all. That is not the case. The optician who lives by the sale of his glasses, would naturally want to correct every refractive error that came his way, but the oculist prescribes only where definitely indicated to improve vision or to relieve a definite train of symptoms. Before leaving the question of glasses, I would like to make one point clear. I am often asked by both medical men and laymen whether the manufacturing optician is not as capable of correctly prescribing glasses as the oculist and I say unhesitatingly that he is not. I consider that the position occupied by the optician in eye work is practically analogous to that of the certified midwife in obstetrical practice. The trained midwife could conduct successfully and unaided probably 75% of all confinements, just as the skilled optician is capable to treating 75% of all simple refractive errors in the adult, even although his treatment without the aid of a cycloplegic cannot be considered anything but unscientific. The skilled and scrupulous optician refers his difficult and complicated cases to the oculist, while the unskilled or unscrupulous spectacle purveyor with a main eye to the sale of his wares may attempt treatment and by so doing may do inestimable damage, both by his treatment and by reason of delaying the patient from seeking expert advice. The maximum of good and reliable work is to be obtained from both midwife and optician, when they are working under medical orders.

General Considerations.

Specializing in any branch of medicine has much to recommend it, but I am afraid that there is a great tendency amongst specialists to develope myopia with a contracted field of vision. I must plead guilty to the tendency in myself to regard my patients as so many detached pairs of eyes, just as I am sure the ear, nose and throat surgeon sees in his waiting room so many noses to be burnt, throats to be gouged or antra to be washed out. We are inclined to forget temporarily that we are dealing not with organs the treatment of which is the beginning and end of our work, but with human beings who may be demonstrating through the medium of a diseased eye or a tonsillitis some general pathological process requiring more assistance than we can give the patient in our narrow specialty. Just as much to be deprecated is the tendency among general practitioners to divorce such special organs as the eye, ear *et cetera* from the other parts of the body and consider their pathology a matter for the specialist only. There are certainly many diseases in which a study of the eyes may be of great service to the general practitioner. A fundus examination will often reveal the earliest signs of a general arterio-sclerosis and the condition of the retinal vessels can be very safely taken as a guide to the nature of the cerebral vessels. The eye surgeon will often be the first to find in the tortuous silver wire arteries and the nipped veins of the retina the danger signal of an impending rise in blood-pressure. The presence of retinal hæmorrhages, moreover, in patients with increased blood-pressure is of extreme clinical importance in indicating the progression of the condition from one of simple hyperpiesis to a definite arterio-sclerosis with degeneration of the vessel walls. The presence of retinal hæmorrhages and exudates in nephritis may help to decide the prognosis, being in the majority of cases an ominous manifestation. Swelling of the optic discs will often decide the question of the presence of increased intra-cranial pressure and the advisability or otherwise of operative interference. Isolated paresis of the eye muscles will indicate the site of a brain lesion, as will the nature of the field of vision in lesions affecting the visual paths. A phlyctenular conjunctivitis may be in children the first evidence of a scrofulous diathesis. An interstitial keratitis may be the first sign of congenital syphilis, while an intractable iritis may lead to the elicitation for the first time in the patient's clinical history of a response to the Wassermann test. Double symmetrical proptosis, besides being a possible manifestation of disordered thyreoid, has been known to be in children the earliest and only evident sign of a malignant growth of the kidney, the proptosis being the direct result of a metastasis at the base of the brain. I need not dilate upon the value to the general practitioner of an examination of the pupils and their reactions in central and peripheral nerve lesions and acute poisonings, but one practical point I would like to impress upon you in arriving at a correct estimate of the pupillary reaction to light, is the absolute necessity of testing each eye separately, covering the other meanwhile. Also, in dealing with dilated reactionless pupils, it is always advisable to exclude the previous introduction of any mydriatic, intentionally or otherwise or of a miotic in the case of tightly contracted pupils.

I am becoming more impressed every day with the direct relationship that seems to exist in disease between the eye and the accessory sinuses. The structures of the eye seem to have such a definite affinity for the toxins produced in accessory sinus disease, that almost any eye affection from a mild asthenopia to a choked disc may be the outcome of an infected sinus condition. Congestive conditions of the sphenoidal and occasionally of the ethmoidal cells may by direct pressure produce an inflammatory condition of the optic nerve which will, if untreated, lead to atrophy and permanent loss of vision. Almost equally important in the diagnosis

and treatment of obscure eye conditions is an examination of the throat and teeth for possible septic foci. In the examination of the accessory sinuses and the teeth the radiologist is indispensable. Many a tooth may be unnecessarily sacrificed, just as many a septum is unnecessarily resected. I have, however, seen brilliant results follow the extraction of an incompletely filled tooth and I have read of (but have never seen) astigmatic errors being materially reduced by a submucous resection of the nasal septum.

In the practice of eye surgery I have come to the conclusion that general anæsthesia is rarely indicated. For such minor operations as the removal of foreign bodies from the cornea, the evacuation of Meibomian cysts or the removal of pterygia, cocaine still maintains its position in spite of many attempts to replace it by less toxic products. In intra-ocular and muscle operations also cocaine is the most suitable anæsthetic in the opinion of most eye surgeons; while in such operations as the extirpation of the lachrymal sac, enucleation of the eye and in plastic lid surgery "Novocain" injected in 2% solution is vastly superior to general anæsthesia. On the few occasions when a general anæsthetic may be advisable, as in the case of very young children or particularly nervous patients, or in such extensive operations as exenteration of the orbit, the intra-tracheal administration is the ideal method from the surgeon's point of view.

Just before concluding my somewhat rambling remarks, I would like to mention very briefly a new theory of vision that bids fair to supplant the Young-Helmholtz and Hering theories on which we have all been so religiously brought up. Ingenious though they be, neither of the latter theories can answer all arguments or account for all the phenomena connected with the act of vision. To take one example only it is a well-known fact that we cannot with our eyes discriminate between a pure spectral colour and one that consists of a combination of two or more spectral colours. In listening to a chord of music, our ears can detect each note that goes to the making of the harmony. If we combine the primary colours blue and yellow to produce the shade of green we desire, our eyes, if either the Helmholtz or Hering theory is right, ought to be able to discern the primary colours in the finished product. But this is not so. The theory propounded by Schanz, of Dresden, is briefly this: It is an established fact that light acts upon matter only when it is absorbed by the matter and electrifies it. This is a phenomenon peculiar to the light of the shorter wave lengths; the waves must actually penetrate into the molecules and expel the electrons. Schanz considers that this physical process must accompany every act of vision. The light rays that penetrate the depth of the eye, are absorbed by the retinal pigment, producing an expulsion of electrons which are hurled against the rods and cones. These in their turn collect and transmit the electric current by way of the optic nerve to the brain. The velocity of the expelled electrons varies directly with the wave lengths of the light, that is the shorter the wave lengths the greater the velocity and *vice versa*. From this we can reasonably deduce that when light from two different regions of the spectrum acts upon the retina, the velocities of the expelled electrons may be very quickly equalized, the faster hurrying on the slower and the slower helping to retard the faster until, by the time the current reaches the brain, the velocity is that of electrons due to spectral rays coming from somewhere about midway between the original two regions. This is very briefly the essence of a theory which is, to say the least of it, particularly entertaining and well worthy of deep consideration.

SOME RESULTS OF VACCINE THERAPY.

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THE following notes give the results of vaccine treatment in eighteen cases in private practice.

The number is small, but is a series of consecutive cases. The results are encouraging particularly in view of the fact that conditions were far from ideal. For instance, cultures took twenty-four hours in transit to a laboratory and most of the patients lived at distances that made observation of local, focal and general reactions impossible.

The autogenous vaccines used were prepared at the Bacteriological Laboratory, Melbourne University, the initial dose (usually forty to sixty millions) suggested by the Director, Dr. R. J. Bull, being used and then increased rapidly at five day intervals so long as the patient could report no symptoms referable to local, focal or general reactions.

Case.	Condition.	Vaccine.	Result.	Remarks.
1.—Female, aged twenty - five years. September, 1919	Chronic pyelitis, six months. Urinary symptoms not marked. Asthenia and mental depression. Attacks of vomiting and headache. Pus and *Bacillus coli* found in urine. Medicinal treatment unavailing.	Stock *Bacillus coli*.	Disappearance of pus and bacteria in five weeks. Rapid gain in weight and return to normal health and vigour.	Slight relapse in 1920 yielded readily to hexamine. No subsequent relapse.
2.—Female, aged fifty-six years. October, 1919	Rheumatoid arthritis of ten years' duration. Patient could hobble painfully a few steps with help, but was practically bedridden and suffered great joint pain at night.	Autogenous from septic tooth socket.	Definite improvement in four weeks. Cessation of pain. Arrest of the disease and steady improvement permitting a return to household duties and free walking without the aid of a stick.	Three septic teeth were removed—all she had. No relapse.

Case.	Condition.	Vaccine.	Result.	Remarks.
3.—Male, aged thirty - five years, October, 1919	Catarrh of respiratory passages with very frequent febrile and debilitating exacerbations.	Stock *catarrhalis* and staphylococcus.	Improvement set in about a month after treatment. For four years colds were rare.	Relapse in the last three months and the patient sought more vaccine treatment.
4.—Female, aged twenty - three years, January, 1920	Recurrent tonsillitis and peritonsillar abscess for years; streptococci in pus.	Stock polyvalent streptococcus.	No tonsillitis or abscess since treatment.	
5.—Female, aged forty - four years, January, 1920	Chronic pyelitis, ill-health twenty-two years, marked asthenia, frequent attacks of pain in loin and vomiting, pus and bacteria in urine.	Autogenous *Bacillus coli*.	Improvement in three weeks, rapid return to normal health and vigour; weight increased five kilograms (eleven pounds).	No relapse. For something like twenty years this patient had been regarded as a "martyr to bilious attacks." Now entirely disappeared.
6.—Female, aged twenty - four years, July, 1920	Chronic naso-pharyngeal catarrh with very frequent severe paroxysms of sneezing stimulating hay fever, but non-seasonal.	Autogenous from naso-pharyngeal swab, pneumococci, streptococci and *Micrococcus catarrhalis*.	No sneezing since fourth injection; catarrh greatly reduced.	No relapse as regards sneezing; some relapse to catarrhal condition lately.
7.—Male, aged twenty - six years, July, 1920	Chronic naso-pharyngeal catarrh.	Autogenous from naso - pharyngeal swab containing streptococcus, pneumococcus, Friedländer's bacillus, *Micrococcus catarrhalis* and diphtheroids.	Improvements for some months only.	
8.—Female, February, 1920	Rheumatoid arthritis. No septic focus discovered, but urine contained *Staphylococcus albus*.	Autogenous from urine, *Staphylococcus albus*.	No immediate improvement.	The disease has not progressed since treatment.
9.—Female, aged thirty - eight years, July, 1920	Chronic pyelitis, months before and during pregnancy.	Autogenous from urine.	Disappearance of all symptoms and of pus and bacteria from the urine.	Similar conditions five years previously had been successfully treated by autogenous vaccine.
10.—Female, aged forty - eight years, December, 1920	Chronic pyelitis; ten years' history of ill-health, anæmia, asthenia, frequent fainting attacks, occasional frequency of micturition.	Autogenous from urine, *Staphylococcus albus*.	Cessation of all symptoms. Weight increased 3.2 kilograms (seven pounds) in seven weeks, health and vigour returned to normal.	No relapse.
11.—Male, aged thirty - four years, August, 1921	Post-nasal catarrh, deafness.	Autogenous from naso-pharynx.	No improvement.	A visit to city specialist being unavailing the vaccine was tried as a forlorn hope.
12.—Male, aged thirty - eight years, October, 1921	Recurrent tonsillitis and pharyngitis.	Autogenous from tonsils streptococci and pneumococci.		
13.—Female, aged forty - five years, October, 1922	Rheumatoid arthritis, pain and deformity of joints, particularly of the fingers, progressive for two years. Feet affected till walking became difficult and painful.	Autogenous from septic tooth.	Relief commenced in two weeks, pain ceased, suppleness of joints returned almost to normal and walking became normal.	Two septic tooth stumps found buried in the gum at the back of the upper jaw were removed. Their presence had been entirely forgotten by patient. No relapse till June 20, 1924, when a little stiffness of shoulders and fingers was complained of.
14.—Male, aged forty - five years, February, 1923	Chronic bronchitis forty years, asthma for thirty-six years, emphysema, copious sputum, very frequent severe asthmatic attacks, severe debility.	Autogenous from sputum, streptococcus, pneumococcus, *Staphylococcus albus*, coliform bacilli.	Total disappearance of asthma, no relapse, almost total disappearance of sputum, weight increased by 7.2 kilograms (sixteen pounds).	This response to treatment surpassed all expectation.
15.—Female, aged twenty - five years, November, 1922	Recurrent tonsillitis.	Autogenous from tonsillar crypt, *Staphylococcus albus*, *Staphylococcus aureus*, pneumococci, streptococci and diphtheroids.	No improvement.	The patient wished to avoid operation, but was warned of the uncertainty of vaccine results.

Case.	Condition.	Vaccine.	Result.	Remarks.
16.—Male, aged thirty-four years, January, 1923	Subacute bacterial endocarditis.	Autogenous from pyorrhœa.	No improvement.	A blood culture was made, but no bacteria found and the vaccine a forlorn hope.
17.—Male, aged thirty-eight years, April, 1924	Asthma for eleven years, history of antecedent bronchitis and emphysema.	Autogenous swab from naso-pharynx diphtheroids and streptococci.	No improvement to date.	Compare No. 18.
18.—Male, aged ten years, April, 1924	Asthma, bronchitis very frequently since infancy, asthmatic attacks for three years; pale, thin, miserable, hardly ever at school.	Autogenous swab from naso-pharynx staphylococci, streptococci, pneumococci, *Micrococcus catarrhalis*, diphtheroids, first dose 40 millions; twelfth dose, 880 millions.	Asthmatic attacks ceased after fourth injection. Cough sputum and anorexia disappeared. Weight increased by six pounds in ten weeks. He is now a bright, happy and vigorous schoolboy.	The degree and rapidity of the change in this patient's general condition even early in treatment was remarkable.

From ten to fifteen subcutaneous injections were used in each case, the site of injection being the outer aspect of the left arm in every case except one in which a little undue tenderness developed necessitating another site for injection.

Thus vaccine therapy proved highly successful in two cases out of three of rheumatoid arthritis, two cases out of three of bacterial asthma, four cases out of four of chronic pyelitis, one case out of three of recurrent throat infections, one case out of four of naso-pharyngeal catarrh. It was of no value in the case of subacute bacterial endocarditis. A more careful selection of cases, the use exclusively of autogenous vaccines and careful control of dosage by observation of focal reactions should yield even better results and prove a great aid in dealing with certain difficult cases which are so hard to treat satisfactorily in any other way.

My thanks are due to Dr. R. J. Bull, Melbourne University, for preparation of the vaccines and many useful suggestions in their employment.

Reports of Cases.

INTRA-CRANIAL CALCIFICATION, PROBABLY IN A TUMOUR IN THE REGION OF THE PINEAL BODY.[1]

By E. S. MEYERS, M.B. (Sydney),
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Brisbane Hospital.

ON January 28, 1924, I was called to see F.H., *ætatis* forty-six years, a male, married, blacksmith, who was complaining of headache, weakness and inability to work, occasional retching and giddiness. The patient stated that he had had pain in both temples for two weeks, after which time he had received a blow from a file on the left temple and that he had had pain in the head for the ensuing three months.

On examination the patient was found to be a fairly well-nourished man; he seemed to be depressed and his appearance bore out the statement that he had suffered from intense headaches.

The headache was described as "bursting" and the patient was seldom without an uneasy feeling in the head. He also had a rather peculiar mask-like appearance. Gordon Holmes, in Osler's "Modern Medicine" (1910) is quoted as commenting on a mask-like appearance encountered in lesions involving the *tegmentum*. Further examination of all systems failed to reveal any abnormality of note.

On March 7, 1924, Dr. Arthur Murphy examined the patient at my request, paying attention more particularly to the question of equilibration. Dr. Murphy reported that the patient was very nervous; he seemed to be deaf, but the left ear on being tested was normal. His cerebration was active while his attention was held, but the patient quickly abandoned concentration. Nothing abnormal was detected on examination of either eye. The fields of vision were not measured. In the right ear there was a moderate degree of conduction deafness due to middle-ear changes. The left ear was normal. The Babinski-Weil-Wallsing test yielded a definite deviation to the left. There was no Rombergism nor spontaneous past pointing or adiadokokinesis. The "cold caloric test" applied to the vertical canals by Dundas Grant's method revealed no definite abnormality in either ear, but gave rise to past pointing to the left in both sides. The pupils were equal and reacted normally to light and accommodation. The right knee jerk was normal. The left knee jerk was greatly increased. No ankle clonus was elicited. The plantar response on both sides was flexor. The patient had definite paresis in the muscles of the left arm, forearm and hand.

On March 9, 1924, Dr. Murphy reported that the patient was irritable, but not nervous. He was unable to carry out a satisfactory test for visual fields. The findings were as on March 7, but paresis of the left upper limb was not so definite and the left knee jerk was not definitely exaggerated.

On March 11, 1924, Dr. Murphy found that the Babinski-Weil-Wallsing test did not give rise to any deviation to the left; if anything the deviation tended to the right

There was some confusion of thermal sense in all four extremities, but this seemed to be unreliable. Otherwise the patient's condition was unchanged. Tests for visual fields revealed that the right visual and colour fields were within normal limits. The left visual field was concentrically contracted, but there was no proportionate diminution of the colour fields. There was no abnormality in scotomata.

In analysing these findings in conjunction with the history and symptoms, Dr. Murphy reported that the history of onset following influenza, recurrent mild rigors (the last three days prior to his first examination) and the evanescent paresis were in favour of brain abscess, but the localization of the abscess offered objections to this diagnosis for three reasons. In the first place the severity of the pain which seemed to be due to disturbed intra-ventricular fluid circulation in the left lateral ventricle, was out of proportion to the findings of disturbance of

[1] Read at a meeting of the Brisbane Hospital Clinical Society on July 10, 1924.

function in other respects. In the second place the contraction of the left visual field without other ocular troubles was not likely in abscess. In the third place the form of ataxia was definitely not vestibular and only faintly resembled cerebellar ataxia. Dr. Murphy concluded that it must have been concerned with association fibres connecting the cerebellum with other parts of the equilibrium apparatus. It was unlikely that an abscess would cause this symptom without at the same time causing some definite muscle paralysis somewhere, most likely in the external ocular muscles.

Dr. Murphy considered that the next most likely thing was tumour in the neighbourhood of the right *crus cerebri*. If this caused interference with the *corpora quadrigemina* and the external geniculate body on that side there would be a possible explanation of the paresis, the contraction of the visual field and perhaps of the impairment of hearing on the left side, though the hearing tests seemed to reveal an intact nerve. Further, in the neighbourhood, interference with association fibres of equilibration would be reasonable. Against this, however, was the mild nature of all the signs and symptoms, except pain, especially the absence of ocular or facial palsies. He held that the acceptance of the diagnosis of tumour rather ignored the onset after influenza and possibly relied on the much more remote injury to the head.

In summarizing the evidence Dr. Murphy stated that if the contents of the cranium should be blamed for the trouble the diagnosis would rest between: (i.) Abscess, fairly large, deep in substance of the cerebral hemisphere and approaching and slightly involving the *genu* and the commencement of the posterior limb of the internal capsule. The history was in favour of this; the signs were against it. (ii.) A small tumour in the region of the right *crus cerebri* interfering with the *corpora quadrigemina*, external geniculate body and equilibrium association fibres, disturbing the cerebro-spinal circulation by pressure through the aqueduct of Sylvius. The history did not favour this diagnosis; the signs did.

Owing to the patient's disturbed state and his unwillingness to submit to the tests, Dr. Murphy had omitted both rotation and galvanic equilibration tests, as the visual field test was not definitely completed till the last examination. He considered it essential to obtain some reasonable finding about it.

On March 12, 1924, the patient was admitted to a medical ward of the Brisbane Hospital. There was at that time pain in both temples, worse in the left. The patient said that he seemed to be going round, so that objects moved to the left, though occasionally they moved to the right. There was dry retching in the morning two or three times a week and also some loss of power in the limbs of the left side.

Dr. Murphy had observed this loss of power on one occasion. I examined carefully for loss of muscular power, but was unable to detect any.

On March 18, 1924, lumbar puncture was performed. Unfortunately the specimen was lost. The blood serum did not react to the Wassermann test.

Dr. Val McDowall made an X-ray examination of the skull and reported the presence of a small psammoma in the centre of the cranial cavity.

On March 22, 1924, Dr. George Thomson examined the fundi and reported that both discs were definitely congested, the right more than the left. There was blurring of the edges.

During his stay in hospital the patient suffered from frequent headaches, unrelieved despite treatment with iodide of potash and "Neokharsivan." He was discharged from hospital on April 14, 1924.

I again saw the patient on April 20, 1924, when his condition was much the same as before. He was very anxious that something should be done to relieve him. The risks of operation were pointed out to him and he decided that he would sooner be dead than go on suffering. By this time I was of the opinion that there was a tumour in the posterior end of the *corpus callosum*, more so after perusal of an article by Walter E. Dandy,[1] of the Johns Hopkins Hospital, Baltimore. I decided to turn down an osteoplastic flap following the method described by Dandy. This would serve as a decompression operation and should circumstances be favourable, an attack could be made on the tumour.

On April 30, 1924, under intra-pharyngeal ether anæsthesia skin incisions and openings for bone flaps were outlined permitting a thorough exposure of the posterior two-thirds of the right cerebral hemisphere. This procedure was time-consuming and as the patient was suffering from a good deal of shock, it was decided to proceed with the operation on a subsequent occasion.

On May 7, 1924, under ether anæsthesia administered by the open method further trephine openings were made and with Gigli's saw intervening bone was divided. The large osteoplastic flap was elevated, fractured at its base and turned back. The *dura mater* was opened; cerebro-spinal fluid did not appear to be under excessive pressure. The cerebral hemisphere appeared to be normal and was retracted laterally. At this stage troublesome hæmorrhage from the longitudinal sinus was experienced and the patient was suffering from a good deal of shock. It was decided to replace the osteoplastic flap and to leave out the bone removed by trephine (seven pieces in all, three of which were of large size). The longitudinal sinus was plugged with gauze. The patient made a satisfactory post-operative recovery, the only disability being slight foot drop on the left side, a condition which has since cleared up. This transient palsy is noted by several cranial surgeons.

Soon after the operation the patient reported that his headache had disappeared.

On May 15, 1924, Dr. George Thomson reported that there was a very slight blurring of the edges of both optic discs and that the swelling was subsiding.

The patient was discharged from hospital on June 16, 1924.

Until the present date (August 11, 1924) the patient has suffered very little from headache. There has been neither giddiness nor retching. He has regained strength, sleeps well and has put on about 6.35 kilograms (one stone) in weight.

Professor Hunter very kindly examined the skiagrams and on July 11, 1924, reported:

> I have carefully examined the radiographs you sent me. It appears to me that the shadow corresponds with the position of the *lamina quadrigemina* of the mid-brain and is probably due to a tumour of the pineal body. You will be able to verify this from the accompanying figures from Eccleshymer and Shoemaker's "Atlas." The line of section is 7—7.

Comment.

Cases of intra-cranial calcification are rare. Miller, of Denver,[2] reports a case of intra-cranial calcification with successful operation and recovery. He states that an exhaustive study of the literature was made by Heuer and Dandy who found that up to 1916 there had been but seven cases reported. One observer had noted a shadow due to a calcified tumour of the pineal gland. Dandy in his article,[1] dealing with pineal tumours, writes that the symptoms which bring the patient to the physician are those of intra-cranial pressure due to an internal hydrocephalus which is caused by occlusion of the aqueduct of Sylvius. He adds somewhat dogmatically: "Tumours of the pineal body can be helped by only one form of therapy, *i.e.*, operative removal. No palliative benefits can possibly accrue from a decompression." This statement does not seem to be borne out by the case reported here.

In connexion with this case a recent article of Yositame Izawa, of the Okayama Medical School,[3] is worthy of study. Izawa's main conclusion is that the pineal body's chief function is to repress the premature development of the sexual organs in the female as well as in the male. At the end of the article will be found an excellent bibliography. Most of the journals mentioned were unfortunately not available for study by me.

References.

(1) Walter E. Dandy: "An Operation for the Removal of Pineal Tumours," *Surgery, Gynecology and Obstetrics*, August, 1921.

(2) E. A. Miller: "Calculi Within the Brain," *Surgery, Gynecology and Obstetrics*, June, 1922.

(3) Yositame Izawa: *The American Journal of the Medical Sciences*, Volume CLXVI., 1923, page 185.

The Medical Journal of Australia

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Accidents in Industry.

REFERENCE was made in a recent issue to the subject of factory inspection as one of the instruments in the hands of the industrial hygienist for conserving the health of the worker. Preventive medicine as applied to industry covers a considerable field. It is of primary importance that a medical practitioner in whose charge the employees in a given industry are placed, shall be thoroughly conversant with the chemical and physical aspects of the process with which these individuals are concerned. The mechanical and personal factors must not, however, escape his attention. Accidents with their resulting loss of life and limb are in a large measure preventible. It is true that their elimination cannot be entirely accomplished by medical science, but the personal influence of the medical practitioner may induce greater care on the part of the employees and it may well be part of his duty to see that apparatus designed to prevent accidents is placed to the best advantage.

It has been found by experience that legal enactments are inadequate as a means of preventing accidents. The "safety first" movement has in Great Britain and the United States of America been held to be an important factor in reducing the number of accidents. It has been computed that over 70% of the accidents occurring in factories are not preventible by any mechanical devices, but are due to psychological reasons, to momentary inattention or to carelessness bred of familiarity. It is not so long since an employee in one of the large workshops in the Commonwealth was killed by the very piece of machinery of the danger of which he had to warn passers-by.

The question of safety and the prevention of accidents was one which was considered in conjunction with factory inspection at the Fifth International Labour Conference at Geneva in 1923. In the final recommendation of the Conference it was pointed out that while it was essential that inspectors should be invested with all the legal powers necessary for the performance of their duties, it was equally important in order that inspection might progressively become more effective, that, in accordance with the tendencies manifested in the oldest and more experienced countries, inspection should be increasingly directed towards securing the adoption of the most suitable safety methods for preventing accidents and diseases. It was held that this should be done with a view to rendering work less dangerous, more healthy and even less exhausting. It was recognized that the intelligent understanding, education and cooperation of all concerned was necessary for the attainment of this ideal. It may be of interest to quote in full the methods which were regarded as being calculated to promote this development in all countries. They are as follows:

> That all accidents should be notified to the competent authorities and that one of the essential duties of the inspectors should be to investigate accidents and more especially those of a serious character with a view to ascertaining by what measures they can be prevented.
>
> That inspectors should inform and advise employers respecting the best standards of health and safety.
>
> That inspectors should encourage the collaboration of employers, managing staff and workers for the promotion of personal caution, safety methods and the perfecting of safety equipment.
>
> That inspectors should endeavour to promote the improvement and perfecting of measures of health and safety, by the systematic study of technical methods for the internal equipment of undertakings, by special investigations into problems of health and safety and by any other means.

In our previous reference to this subject the recommendation of the Conference was quoted in regard to the necessity of the employment of experts with competent medical, engineering, electric or other scientific training to deal with scientific and technical questions in industry. When this recommendation is considered in conjunction with the statement in regard to the prevention of accidents, the place of the medical hygienist in the scheme of things becomes manifest.

It has been pointed out that in some countries, including the United States, Canada and Switzerland, it has been recognized that there is a close connexion between accident prevention and accident insurance. In these places certain insurance companies offer the employer a reduction in his premium on condition that he instals certain equip-

ment which will lower the accident risk in his factory. It has been found that this system is very effective in overcoming the manufacturer's reluctance to introduce the necessary equipment. The result of this arrangement has been that in some instances the ordinary inspectors have been relieved of portion of their responsibility and that the supervision of accident prevention is left to the representatives of the insurance companies. In other countries the factories are liable to double inspection. This point is, however, immaterial. Insurance companies have on more than one occasion been of assistance in regard to the health of the community. The action of the Metropolitan Life Insurance Company of New York in regard to tuberculosis and the town of Framingham is a case in point (THE MEDICAL JOURNAL OF AUSTRALIA, November 18, 1922). The International Labour Conference regarded the aid of the insurance companies of such importance that a special resolution was adopted emphasizing the wisdom of the reduction of insurance premia as a means of improving health conditions and reducing the number of accidents. The International Labour Office was further recommended to proceed to a survey of the measures in force in various countries operating in this manner. The result of this investigation will doubtless be presented at a subsequent conference and when available will be discussed in these columns.

Current Comment.

INTESTINAL AUTO-INTOXICATION.

THERE has arisen out of modern scientific work a leaning toward generalization which is both unscientific and unsound. When bacteria were first recognized as causes of certain infective processes, the medical profession rushed eagerly to an unjustified conclusion that practically every disease was of bacterial origin. Even fractures of long bones have been attributed to such a cause. Similarly the discovery of one or two pathological processes resulting from the deficiency of the natural products of certain glands of internal secretion has induced many bold clinicians to attribute other diseases to a similar causation. The fact that some bacilli elaborate definite toxins in the medium in which they grow, has led the greater part of the medical profession throughout the world to speak without reserve of toxæmias of the most varied kinds. In fact there is scarcely an acute disease known in connexion with which a toxæmia has not been invented. The necessity of producing evidence of the existence of a poisonous chemical substances capable of being isolated from the tissues or organs does not seem to be realized. Clinicians speak glibly of toxins in connexion with infective conditions due to bacteria which produce no exotoxins at all. Intestinal toxæmia is a commonplace, although even the stoutest supporters of this flimsy hypothesis have only a hazy conception as to the chemical composition of the toxin supposed to be involved. The toxæmias of pregnancy represent a group of differing affections of unknown ætiology; the assumption of one or more toxins as causes of these processes is devoid of scientific basis. If medicine is ever to become an exact science, its practitioners must give up the comfortable habit of the uncritical acceptance of loose hypotheses not supported by observed facts. There are many bogeys and superstitions which should be expunged from orthodox medicine. One of the first steps to this end would be the exclusion of words and terms which do not convey a properly defined meaning.

In a very critical and admirable article Dr. Walter C. Alvarez has recently reviewed all the evidence available in favour of the acceptance of the condition spoken of as intestinal auto-intoxication and his verdict is that this condition is a very rare one.[1] We regret that lack of space prevents us from reproducing all his arguments and analyses of the facts on which the commonly accepted doctrines are based. A few must suffice to convince the thoughtful reader that these doctrines are flights of imagination. The conception that poisonous substances pass from the loaded bowel and give rise to a very large number of illnesses seems to date back to the middle ages. In recent times all sorts of refinements have been added to these hypotheses without any revision of the fundamental data. Metchnikoff's attempts to substitute harmless bacteria in the intestines for the normal inhabitants which he supposed were harmful, were singularly unhappy, since it has been shown that the Bulgarian bacillus is incapable of holding its own against the other intestinal bacteria and that sour milk does not in fact alter the intestinal flora to a material extent. Lane's spectacular surgery is based on the postulation of intestinal stasis as a cause of many pathological processes which can be proved to occur when stasis is not present.

Dr. Alvarez considers one by one the possible chemical substances which might be held to give rise to auto-intoxication. Some chemical substances concerned with digestion are undoubtedly toxic when injected intravenously, such as trypsin and bile salts, but the most careful investigations by physiologists have demonstrated that neither act as poisons within the body. Similarly the myth of proteins, proteoses and peptones acting as poisons in the body is readily refuted. That the dissociation products of protein, the amino acids, are toxic when injected artificially, is admitted, but under natural

[1] *Physiological Reviews*, July, 1924.

conditions these substances exist in very weak concentration and rapidly undergo further dissociation. There is a mass of evidence to show that the liver can deal with more of the intermediate products than it is ever called upon to hold during life. Hydrogen sulphide and ammonia have been suggested as poisons, but the only evidence of a harmful action is that associated with the experimental injection of relatively large quantities under conditions which do not occur in nature. Oxalic acid is a normal constituent of urine and is manufactured from food. Small quantities are harmless when taken by the mouth; Piotrowski experienced no discomfort after swallowing eight grammes within an hour. Similarly indol can be dealt with by the body in quantities and concentrations encountered, although both are poisonous when supplied experimentally to some laboratory animals. Herter found that indol in doses of one gramme spread over the day could be taken by mouth by men without untoward result. Dr. Alvarez continues his search among the physiological substances and in each instance he finds the evidence of any possible toxic effect quite unacceptable. In the next place he turns to the intestinal bacteria as a possible source of intoxication. It would seem that in children certain types of bacteria in the gut are capable of inducing symptoms. Porter has handled many children with severe symptoms apparently referable to putrefactive bacteria in excess. He has given these children large quantities of lactose in a solution of bicarbonate of soda with very gratifying results. It would appear, however, that the same form of bacterial poisoning does not take place in adults.

Certain symptoms occur very frequently in association with constipation. These are mental torpor, malaise, headache, loss of appetite and nausea. The tongue becomes coated. Dr. Alvarez states very definitely that these symptoms and signs are rarely due to the absorption of a poison. They disappear almost instantaneously when the bowels move. He contends that symptoms of a toxic action of a circulating chemical substance would necessarily diminish gradually when the source of these substances is removed. Time must elapse before the toxin is eliminated. Donaldson carried out some very impressive experiments on five normal men. He controlled their reaction times for sight, touch and hearing, their basal metabolic rates, their fatigue reactions, their blood urea, uric acid, sugar and non-protein nitrogen, blood viscosity, indican content of the urine, skiagraphic appearances of the gastro-intestinal canal, blood pressure and pulse rate. After these observations had been carried out under usual conditions, each man voluntarily restrained the evacuation of the bowels for ninety hours. All the usual symptoms of constipation occurred. The reaction times increased, the blood sugar was increased, the basal metabolic rate rose. It was noted on the skiagrams that the food remnant passed into the colon and the ileum remained free from fæces. At the end of the period each man had a free motion of the bowels and all the distress passed off at once. The reaction times, the metabolic rates, the blood sugar and so forth all returned immediately to normal. Quite a lot of evidence is adduced to prove that the symptoms of constipation are the result of mechanical distension and irritation of the rectum. The same effects have been produced by packing the rectum with cotton wool.

Other arguments have been brought forward which combine to overthrow the doctrine of auto-intoxication. There is scarcely any absorption of poisonous substances from the colon. As the fæcal mass becomes more and more inspissated, the probability of any absorption is proportionately reduced. No toxic substances could be abstracted by the bowel wall from a dry, inert mass of fæces in the rectum. Some extraordinary facts have been recorded in regard to the effect of prolonged stagnation of the rectal contents. Many authentic records exist of persons who have kept in good health without an action of the bowels from periods extending up to a year and more. Some of these persons enjoyed three meals a day and worked hard. No symptoms of constipation were present. At the end of the period very large quantities of fæces were removed. The problem is a different one when there is obstruction to the onward passage of the contents of the higher reaches of the small intestine, but even in this connexion the attempts to discover a chemical substance responsible for the symptoms have failed utterly. There is much to be learned about the behaviour of foods and bacteria within the alimentary canal; acute, chronic and latent infections occur and give rise to specific signs and symptoms. If the medical profession would unravel some of these problems and exercise restraint in the assumption of toxic action where no toxin can be demonstrated, a very large number of myths would disappear from our teachings.

ETHNOLOGICAL RESEARCH IN THE PACIFIC ISLANDS.

PROFESSOR GRAFTON ELLIOTT SMITH, F.R.S., has recently made several public utterances concerning the urgency of properly conducted studies of the ethnology of the native races of Australia and the Pacific Islands. He has repeated the warning that unless this work be undertaken at once, the opportunity will be lost for all time. He ascribes the dying out of the natives rather to a disturbance of their psychological interests in life than to the introduction of occidental infections and occidental customs. It will be remembered that a proposal was made at the meeting of the Pan-Pacific Congress to institute a Pacific Medical Service under the administrative control of the International Health Board of the Rockefeller Institution. Some time, no doubt, must elapse before all the countries concerned would sanction such an arrangement, but as time is so important a factor, strenuous efforts should be made to hasten the preliminary steps. The service would be entrusted with this ethnological research as one of its principle functions.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

Excretion of Dyes in the Kidney.

R. N. BIETER AND A. D. HIRSCHFELDER (*American Journal of Physiology*, April, 1924) have studied the excretion of the dye substances phenolsulphonephthalein and sodium sulphindigotate in the frog's kidney by means of the technique introduced by A. N. Richards for the direct observation of the circulation and excretion in the kidney. They have confirmed Richards's observations that under normal conditions blood does not flow through all the glomeruli at once and that the number of active glomeruli is definitely decreased by the subcutaneous injection of adrenalin and increased by urea, theobromine, nitroglycerine, sodium nitrite and hypertonic sodium chloride. Within fifteen minutes after the injection of a solution of a dye into the submaxillary lymph sac of a frog increased flow through the glomeruli could be seen and within a few minutes after this the glomerular capsules could be seen to be distended by a light pink fluid, corresponding to the alkaline solution of phenolsulphonephthalein. In all the animals the dye appeared in the tubules five to forty-five minutes later than in the glomerular capsules and was always of a much deeper hue. The dye does not appear in the glomeruli or the tubules when the circulation through the glomeruli has been cut off, though the tubular blood supply is still intact. The dyes are definitely concentrated in the tubules. These experiments furnish the first objective proof that has as yet been advanced for the theory that the urine is excreted in dilute form in the glomeruli and concentrated in the tubules by the reabsorption of water.

Influence of Diet and Light on the Vitamins of Milk.

ETHEL M. LUCE has studied the effect of diet and light on the growth promoting and anti-rhachitic properties of the milk afforded by a cow and gives details of these studies (*Biochemical Journal*, 1924, Volume XVIII.). The observations were divided into five periods. In period I. the cow was kept on a diet deficient in fat-soluble vitamins, but was out of doors in the sunshine. During period II. the cow received dry fodder in the dark; during period III. green fodder in the dark; during period IV. pasture feeding and during period V. the conditions were the same as in period I. The milk was Pasteurized and used as the sole source of fat soluble vitamins for rats. The diet of the cow appeared to be the main factor in determining the growth promoting value of the milk. When the cow received a diet of fresh green grass, the milk possessed a higher growth-promoting value than when she received dry fodder deficient in fat-soluble vitamins. This result was obtained irrespective of whether the cow was kept out of doors in sunlight or in a dark stall. The evidence as to whether light does or does not contribute is not conclusive from these experiments. The anti-rhachitic value depends on the diet of the cow and possibly also on the degree of illumination to which she is exposed. Milk from a pasture-fed cow had a high anti-rhachitic value; the same animal, when fed in the dark, yielded a milk much inferior in anti-rhachitic properties.

Vascular Reactions of the Skin to Injury.

THE vascular changes associated with the production of wheals which occur on stroking the skin in patients suffering from the condition known as factitious urticaria or dermatographia have been shown by T. Lewis to be identical with those called forth in normal skins when these are subjected to stronger or repeated stimuli of the same kind. T. Lewis and R. T. Grant (*Heart*, 1924, Volume XI.) have studied the relationship of these reactions to the reactions following chemical stimulation of the skin. For various reasons histamine was chosen as a suitable chemical stimulus. A small drop of a very dilute solution of histamine was placed on the skin and the skin pricked through the centre of this drop with a fine needle. The reactions of the skin in urticarial patients in response to stroking consist essentially of: (i.) A central and sharply defined red line restricted to the line of stroke and due to a local dilatation of the superficial capillaries, venules and terminal arterioles; (ii.) a bright red flush and (iii.) the appearance of a raised wheal over the line of stroke. Precisely similar reactions occur after puncturing the skin with histamine. The red spot is best displayed on an arm in which the vessels have been occluded abruptly, after the venous pressure has been raised a little. The local dilatation of the minute skin vessels in both cases is a primary dilatation of these vessels not dependent upon simultaneous dilatation of the arterioles. The surrounding flush is due to widespread dilatation of skin arterioles; it is of a bright arterial colour. The wheal is constituted by an output of fluid into the tissues and a greatly increased blood flow is essential to rapid whealing. The local reaction to excessive heat is of the same nature. From these comparisons and from further evidence of a more direct kind, it seems clear that the reactions of the skin to stroking result from the liberation of a chemical substance in the skin, this substance having a histamine-like action on the blood vessels and nerves. The responses of the skin to scratches and pin pricks and to excessive heat are of a similar or identicel kind and are determined by a chemical stimulus, as also in all probability are the burns produced by ultra-violet light and the reactions provoked by a variety of poisons, such as peptone, mustard oil and mustard gas, croton oil and other blistering fluids, morphine and atropine and by such substances as are introduced into the skin by the bites and stings of insects and of certain hairy plants. The probability of this local production of tissue poisons is well illustrated in scalds and burns. A mild scald or burn is followed by a type reaction such as has been described which is attributed to the liberation in the skin of a diffusible substance having a histamine-like action. More extensive burns give rise to secondary shock-like conditions and this has been suspected for very many years to result from the absorption of toxic substances. Substances have been recovered from burnt skin which, when introduced into a healthy animal, induce a condition resembling shock. There is then a transition from the simple reactions of a healthy skin to a relatively mild stimulus through the more serious to the most grave mechanical injuries and extensive burns.

Blood Sugar and Gastric Hunger Contractions.

IN the conditions so far found to increase gastric hunger contractions there is either a decrease in tissue glycogen (starvation, muscular exercise, ice-pack, phloridzin) or inability of the tissues to burn sugar (pancreatic diabetes). Furthermore one of the symptoms of "Insulin" hypoglycæmia in man is increased hunger. These observations point to the possibility that the availability of carbo-hydrates for utilization by the stomach motor tissues is an important factor in the genesis or intensity of the gastric hunger contractions. If this hypothesis is correct, experimental increase in the level of blood glucose in normal animals should produce inhibition of hunger contractions and experimental decrease in the level should lead either to onset of hunger contractions in the quiescent stomach or to augmentation of hunger contractions when these are already present. E. Bulatao and A. J. Carlson (*American Journal of Physiology*, June, 1924) have investigated these points. Hyperglycæmia produced by the intravenous injection of glucose inhibits normal hunger contractions in normal dogs. In "Insulin" hypoglycæmia in normal dogs increase of gastric tonus and hunger contractions appear at a blood sugar concentration of 0.08% to 0.07%. Glucose inhibits the gastric tetany of hypoglycæmia, lactose does not. In diabetic dogs "Insulin" produces a primary depression of gastric tonus and contractions, followed by increased gastric tonus and contractions when the initial stage of hypoglycæmia is reached. Intravenous injections of glucose do not inhibit gastric tonus and hunger contractions in diabetic dogs except when hypoglycæmia and gastric tetany are induced by "Insulin." Now there is evidence that the first effect of "Insulin" in diabetic animals is an increase in the glycogen content of the

tissues. The results obtained in these experiments explain the excess hunger felt by patients as one of the early symptoms of hypoglycæmia following large doses of "Insulin." They also explain the rapid suppression of hunger in fasting persons on taking sugar by mouth, as well as the depression of hunger, especially in children on eating sweets between meals.

BIOLOGICAL CHEMISTRY.

Relation of Arginine and Histidine and Growth.

W. C. ROSE AND G. J. COX (*Journal of Biological Chemistry*, February, 1924) have made comparative studies on the growth of rats upon diets in which the nitrogen was supplied respectively by casein, completely hydrolysed casein, and hydrolysed casein from which arginine and histidine had been removed by the usual method of silver precipitation. Rats upon completely hydrolised casein grew to maturity, but at slower rates than animals of the same age upon whole casein. Rats upon arginine-histidine-free amino-acid mixture were neither able to grow nor to maintain body weight, but promptly and continually lost weight. The addition of histidine to such a ration resulted invariably in an immediate resumption of growth at a rate almost or quite equal to that of animals upon normal diets. The addition of histidine was followed in every case by a pronounced increase in food consumption, whether the amino-acid was mixed with the diet or fed separately. The addition of arginine to the diet had no perceptible effect on the growth. Arginine and histidine are then not mutually interchangeable in metabolism. Attempts to satisfy the histidine requirement by the inclusion in the diet of creatine or creatinine yielded no results.

Amino-Acid Content of Blood.

C. H. GREENE, K. SANDIFORD AND H ROSS (*Journal of Biological Chemistry*, January, 1924) have determined the amino-acid content of the blood in normal and in a large number of pathological conditions. The blood samples were taken in the morning before breakfast and the amino-nitrogen was determined by Folin's colorimetric method. The amount of amino-nitrogen in the blood varies between 4.8 and 7.8 milligrammes in one hundred cubic centimetres, the average amount being 6.3 milligrammes. This was found to be true in normal persons and in a series of more than four hundred observations covering twenty pathological conditions. The level of amino-nitrogen may be increased by flooding the organism with amino-acids arising from digestion or from the rapid autolysis of body tissue, as has been noted in cases of leuchæmia and acute yellow atrophy of the liver. In general the quantity in the blood is maintained within the foregoing limits with remarkable constancy. Such diseases as uræmia, diabetes, exophthalmic goitre or hepatic insufficiency are not exceptions to this rule.

Irradiated Air and Growth.

RECENTLY E. M. Hume and H. Henderson Smith published a paper in which they claimed that short daily exposures to air which had been irradiated by ultra-violet rays, stimulated to some extent the growth of young rats fed on a diet deficient in vitamin. A. T. A. Webster and L. Hill (*Biochemical Journal*, 1924, XVIII., No. 2) have reinvestigated the subject. In no case were they able to confirm the results of Hume and Smith regarding the growth promoting effects of irradiated air and they come to the definite conclusion that it has no effect on growth. A daily exposure of fifteen minutes to the rays of a 3.5 ampère quartz lamp at a distance of sixty centimetres (two feet) appears to have some stimulating effect on the growth of young rats on a diet deficient in vitamin A., but a daily exposure of ten minutes to a two-ampère lamp apparently had no effect on growth, although it exercises a considerable effect on the calcium and phosphorus metabolism. Evidently the ultra-violet rays do not stimulate growth by preventing rickets as suggested by Steenbock and Nelson. The radiant energy necessary to promote growth appears to be other than that required to cure rickets.

Inorganic Substances in Carbo-Hydrate Metabolism.

THE part which phosphoric acid plays in the process of breaking down the glycogen of the working muscle, suggests that the body phosphates and other inorganic substances may play a part in the general metabolism of carbo-hydrates in the body. G. A. Harrop and Ethel M. Benedict (*Journal of Biological Chemistry*, April, 1924,) have investigated this subject. Should the hypothesis be correct that an intermediary phosphate compound is formed during the conversion of glucose into muscle glycogen or during the oxidation of glucose, there should be found during the process a shift in the mobile inorganic phosphates from other available body stores, such as blood serum, into the muscle tissues. A lowering of the concentration of inorganic phosphates in the blood serum should result and this in turn should produce a drop in the urinary phosphate excretion. As the transformation further progresses and the phosphate-carbo-hydrate compound in its turn is either transformed into glycogen or broken up into smaller fragments, a gradual release of inorganic phosphates back into the blood stream would be expected. With this there should be an increase in blood phosphate concentration and an increased, compensatory, urinary excretion. After the administration of "Insulin" both to normal individuals and to diabetics there was a definite drop in the blood phosphate and potassium during the hours in which "Insulin" was actively influencing carbo-hydrate metabolism. The urinary excretion of phosphates and potassium was also reduced during these hours. The release of this retained phosphate and a great increase in its urinary excretion occurred during the following night, when the effect of "Insulin" was ended. The greatly increased night excretion following the "Insulin" days was in sharp contrast to the much smaller night excretion on the control day. The excretion of potassium varied to the same extent. When glucose is given to normal individuals, a drop in the concentration of serum phosphates occurs simultaneously with the well-known rise in the blood sugar concentration. Of particular interest is the fact that the time of the lowest depression of the phosphate does not coincide with the highest level of the blood sugar concentration, but follows it. This accords in general with the interpretation of Foster and of Maclean and de Wesselow who consider that the rapid return of the blood sugar to its normal level or even below after thirty to sixty minutes is due to the stimulation of the mechanism which deals with sugar. Absorption of glucose from the intestine still continues unchecked, but a balance is struck as indicated by the re-establishment of the blood sugar level, while the mechanism for metabolizing the sugar continues actively at work, as indicated by the continued depression of the inorganic serum phosphate concentration.

Effect of Manganese on Growth.

PLANT and animal cells are known to contain small quantities of such elements as copper and manganese. Their occurrence in living matter indicates some important function on their part. With this view in mind V. E. Levine and H. A. Sohm (*Journal of Biological Chemistry*. February, 1924) have undertaken experiments, with minute quantities of these elements in the diet. Each unit in the experiments was made up of young rats from the same litter. One or two rats were kept as controls and the others were given varying concentrations of manganese sulphate, which in terms of manganese represented dilutions of 1 in 2,000, 1 in 4,000 or 1 in 10,000. The diet used was the McCollum poly-neuritis diet supplemented by orange juice. The results of the experiments indicate that the manganese has a catalytic effect on growth. The manganese rats proved more active than the controls, their coats of hair were sleeker, longer and thicker. These facts are in harmony with the power of manganese salts to accelerate oxidations such as take place with unsaturated oils or in the biological organism. In view of the findings of Evans and Bishop in reference to a dietary factor essential for reproduction it was surprising to find that in a few preliminary experiments, the manganese rats proved fertile and that the offspring grew somewhat faster than the average young rat.

Special Abstract.

THE EFFECT OF MATERNAL SOCIAL CONDITIONS AND NUTRITION UPON BIRTH WEIGHT AND BIRTH LENGTH.

IN 1919 the Medical Research Council of Great Britain appointed a committee to investigate the medical problems of child life. This committee was subsequently divided into an English and a Scottish Branch, each of which was to cooperate with the other. The Scottish Committee consisted of Professor D. Noel Paton, F.R.S., as Chairman, with the following members: Dr. A. J. Chambers, Dr. Leonard Findlay, Dr. T. Y. Finlay, Dr. G. B. Flemming, Professor J. M. Munro Kerr, Sir Leslie Mackenzie and Professor B. P. Watson, with Miss Jean Agnew as Secretary. The English Committee was comprised by Dr. G. F. Still (Chairman), Dr. John Brownlee, Dr. Hector C. Cameron, Dr. J. S. Fairbairn, Dr. Eardley L. Holland, Dr. R. C. Jewesbury and Professor M. S. Pembrey, F.R.S., with Dr. O. L. V. de Wesselow as Secretary. This Joint Committee has issued a report on the effect of maternal social conditions and nutrition upon birth weight and birth length.[1] The report has been written by Miss M. Bruce Murray under the direction of Dr. J. S. Fairbairn. In his preface to the report Dr. Fairbarn states that the clinical records for a period of nine years at Saint Thomas's Hospital and the General Lying-in Hospital, London, afforded excellent material for the report as they covered pre-war, war and post-war periods. Miss Bruce Murray who is an associate of the Institute of Hospital Almoners, abstracted the hospital records, visited patients and collected other material that might be useful as a control. Dr. Fairbairn acted as a medical referee and exercised a general supervision, especially in regard to the exclusion of cases of premature birth and maternal disease which might introduce complicating factors. In order to eliminate possible sources of error from other factors only first babies were selected. The authors of the report also excluded all instances in which the mother had been affected by illness which might affect the child, such as syphilis, tuberculosis, renal and cardiac disease, eclampsia and *ante-partum* hæmorrhage. The exclusion of premature births presented a difficult problem. In hospital cases the patient's dates were taken into consideration. When these were indefinite or doubtful, the medical report on the infant at birth was used as a criterion. When the patient's dates were definitely stated and made the pregnancy a full time one, the child was considered as such even if its weight and measurements were considerably below the average. Malformations and monstrosities were excluded as abnormal.

The Subject and the Material Available.

In the opening portion of her report Miss Bruce draws attention to the work which has previously been done in an attempt to determine how far the development of the fœtus can be affected by maternal nutrition. The results obtained by experiments on animals have been conflicting and many writers of note have questioned the possibility of producing a very small, full term baby by strict dieting of the mother. The upheaval caused by the war provided a ready-made experiment on a large scale in Germany and Austria. Starling pointed out that as early as 1916 the poorer members of the community of these countries received only one-third to two-thirds of the amount of food usually considered adequate. In Germany the daily allowance for each person was 1,800 calories *per diem*. Many investigators recorded observations in regard to the matter and all found that there was no question of war children having a definitely lower birth weight as a result of maternal under-nourishment. Several found an increase in the case of *primiparæ*. One observer, David, found a decrease of 3% to 3.75% in weight averages and 2.5% to 3.2% in length averages during the war. Miss Bruce states that David did not prove this decrease to be due to under-nourishment. She quotes the summing up by Rüge of the general opinion that:

War food, with its substantial reduction as regards albumin and fat values, had no effect on the development of the fœtus. We must agree with Momm that the demands of the fœtus are satisfied by an increase in the maternal metabolism and by accommodation. It developes itself like a parasite regardless of the expense to the mother.

In England no ready-made experiment was provided. The total food supply of the country was found to be more than sufficient on the pre-war basis of supply. Starling stated that on the whole the effect of the war had been to reduce the number of under-fed and ill-nourished members of the working class.

It was impossible to keep a large number of mothers under observation for the purpose of estimating the food that they consumed. The regulations in regard to food rationing were not sufficiently stringent to be of any assistance. It was also regarded as useless to attempt to estimate the exact amount of food consumed by mothers in their own homes. From the family budget system no real estimate could be made of the quantity of food eaten by the mother herself. It was found that much useful information in regard to the social circumstances of the patients as well as the measurements and other necessary information about their clinical history was contained in the records at Saint Thomas's Hospital and the General Lying-in Hospital. To avoid confusion by such influences as place in the family, maternal fatigue by care of other children and other factors, *primiparæ* only were taken into consideration. All *primiparæ* who had been seriously ill and in whom multiple pregnancies had occurred, were also excluded. All definitely premature children were rejected. When maturity was doubtful, the clinical history as well as the weights and lengths alone were considered in an effort to insure that none but full-term children should be included. Observations were made during three different years, namely 1914, 1915 and 1918. These were regarded as pre-war, early war and later war periods. It was decided that classification could be carried out by estimating the actual resources of the mother on a money basis. This had to be the proportion of wages given to the wife by the husband. As only *primiparæ* were included, only two people had to be considered and a net income for all purposes was calculated by the deduction from the mother's money of the rent, family insurances and all weekly payments for furniture and loans. The balance when divided by two leaves a sum representing the net resources of the mother to provide herself with the necessaries of life. This was regarded as only an estimate at best, but it was as near the truth as it was possible to get. When it is considered that amusements, drinks, fares, baby clothes, cleaning materials, gas and in winter fuel had all to be provided for out of the housekeeping money, it would seem more than probable that those girls with net incomes below the average in each year must have been under-nourished.

Method of Division of Women into Classes According to Resources.

The position of each woman in the classification was decided by the amount of money expended in each instance. An average of net incomes was struck and the women were divided into two classes. Class A included those whose resources were above this average and Class B was comprised of those whose resources were below this average. A certain amount of latitude was allowed for those on the border line and special circumstances were considered in alloting these women to one or other group. There were a certain number who apparently were in receipt of no regular income at all. In many instances the women were at a loss to explain how they managed to provide for themselves. The husbands in this group were found to be of unsatisfactory character. The women in this group were carefully considered and all who received such help from relations as would put them in Class B, were included in Class B. The others were placed together in Class C.

Characteristics of the Three Years' Selected.

In 1914 the average income per person was calculated at seven shillings and three pence halfpenny per week. The total number of *primiparæ* having full term normal

[1] "Child Life Investigations: The Effect of Maternal Social Conditions upon Birth Weight and Birth Length," by M. Bruce Murray; Special Report Series, No. 81, Medical Research Council of the Privy Council, 1924.

children in the two hospitals previously mentioned during 1914 was 315. They were grouped as follows: Class A, 101; Class B, 100; Class C, 37. Owing to insufficient details it was impossible to classify 77. The average net income of those in Class B was five shillings and eight pence halfpenny per week.

In 1915 the average cost of living for the year was 23% higher than that for the previous year in July of that year. The average net income for 1915 was calculated as nine shillings and three pence halfpenny, that is an amount slightly in excess of what was necessary to meet the increased prices. Those below this level, having an average income of six shillings and seven pence per week, formed Class B. *Primiparæ* to the number of 328 with full term normal children were treated in both hospitals in 1915. Of these 123 were placed in Class A, 114 in Class B, 26 in Class C and 65 were unclassifiable.

In 1918 the average rise in the cost of living over July, 1914, was 103%. The average net income in 1918 worked out at fourteen shillings, an amount slightly below the equivalent of the 1914 income. The average income of those allotted to Class B was eleven shillings and two pence halfpenny. The number of *primiparæ* having full term normal children in the two hospitals during this year was 436. Of these 138 were placed in Class A, 226 in Class B, 18 in Class C and 54 were unclassifiable. A noticeable feature of this year was the increased number of fathers with bad health.

The Relationship Between Net Income and Birth Weight and Length.

The question of the relationship, if any, between the resources of the mother and birth weight and length were tested by the method of correlation. The figures indicated that if there was any correlation between income and birth weight or income and length at birth, it was in any case exceedingly small and of no practical importance.

Circumstances of Unmarried Mothers.

The numbers of unmarried *primiparæ* confined in the two hospitals were as follows: 106 in 1914, 104 in 1915 and 140 in 1918. All were respectable girls with a definite occupation. Most of them had not only much mental distress and anxiety over their position, but also a really hard struggle to make ends meet and provide for themselves during the last three months of their pregnancy. Enough was not known of the circumstances of these girls to say definitely that as a class they were underfed, but the number who had their normal food, was certainly small. They were grouped in a separate class, Class D.

Examination of Patients from Maternity Homes.

For the purposes of comparison an attempt was made to obtain a series of accurate measurements of the weights and lengths of the infants of mothers in a more well-to-do class of society. This was found to be extraordinarily difficult. It was found in the first place that the records in very few maternity homes were preserved and in the second place it was difficult to be sure that these mothers actually had more money at their disposal than the patients in hospital had. Miss Bruce also points out that it is quite possible in the case of patients in nursing homes that the question of maturity was decided on slightly different lines. If this were so, the tendency would be to produce higher averages. In spite of these difficulties more or less satisfactory records were obtained from two maternity homes. In one instance one hundred cases were recorded and in the other eighty-five.

Summary of Averages.

Several tables of importance are given by Miss Bruce. These include a summary of the average birth weight and length in the several classes in the three years selected. In another table are placed the percentages of the parents' ages in the several classes in different years. In another table the average birth weights and lengths in private patients and hospital patients are set out in all three years combined. Miss Bruce also points out that there are several factors likely to affect the birth weight and length. Among these are the age of the mother, the health of the mother and her height. In a short summary of such a communication as this it is impossible to give many details of figures, nor is it necessary. Those who wish to investigate the subject more closely, will doubtless study the report carefully themselves. In discussing the results of her investigations Miss Bruce shows that the averages for the war years manifest no significant falling off in weight and even an apparent superiority of length. For 1914 the average weight was 3.248 kilograms (7.16 pounds) and the average length was 50.62 centimetres (19.93 inches). In 1915 the average weight was 3.248 kilograms (7.16 pounds) and the average length was 50.98 centimetres (20.07 inches). In 1918 the average weight was 3.235 kilograms (7.11 pounds) and the average length was 51.3 centimetres (20.20 inches). Miss Bruce points out that these findings are confirmed by those of the majority of German and Austrian investigators into similar questions. In Miss Bruce's figures there is, moreover, no significant inferiority on the part of poorer mothers. The averages remain extraordinarily constant and in no class do they fall below the generally accepted average normal birth weight and length for children of *primiparæ*. The children of unmarried mothers, when maternal disease is excluded, do not appear inferior to the children of married *primiparæ*, in spite of the mental strain and hardship of the majority of mothers under observations. In regard to the averages obtained from the two private maternity homes it is pointed out that the average birth weight was 94.9 grammes (three ounces) heavier than in Class A which was the best endowed hospital group. There was also an increase in length of 1.32 centimetres (0.52 inch). In seeking an explanation for the differences, it is pointed out that there might have been a difference in scale and in the method of measuring lengths. It was thought that the higher average weight in the group of private patients might be due to the "excessive number of eight and nine pound babies." It was thought that the question of maternal age might have some bearing on the increase in weight and length, for the patients from the homes were on an average five years older than those in the hospitals. The average of the older and younger mothers in Class A showed no divergence and this result was confirmed by working out the correlation between the mother's age and the baby's birth weight. By this means the factor of maternal age was excluded as an explanation of the greater weight in babies from the homes. The question of maternal height having a bearing on the increased averages from the homes is discussed. Definite data were not available, but by comparison with this factor as observed in hospital patients it is regarded as of small significance. After consideration of the figures obtained from patients in hospitals and in the two maternity homes the following statement is made in the report: "We are, therefore, not prepared, on the present data from homes, to contradict the evidence of the hospital data which supports the idea that the normal average birth weight and length are fully maintained despite varying maternal circumstances."

The question of the price, if any, paid by the undernourished mother for thus safeguarding the child and maintaining the average was outside the scope of the report. In conclusion it is suggested that an investigation might be undertaken to determine the truth of the words of Ver Eecke: "*La gestation constitute donc le plus souvent un sacrifice de l'individue en faveur de l'espèce.*" It is also suggested that it should be determined whether by concerted action such sacrifice can be mitigated.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Adelaide Street, Brisbane, on July 4, 1924, DR. D. GIFFORD CROLL, C.B.E., the President, in the chair.

Abdominal Arterio-Sclerosis.

DR. J. MORRIS ROE read the clinical notes of a patient who suffered from generalized abdominal arterio-sclerosis with thrombosis of the superior mesenteric artery. The patient was a male, aged forty-eight years old, well nourished and somewhat obese. He was a heavy drinker though generally in good health. He had complained of a sudden onset of acute pain in the right hypochondrium near the umbilicus. This had been accompanied by nausea, but there had been no vomiting. The patient had been pale and almost cadaveric in appearance and had found it necessary to sit up on account of difficulty in breathing. The pulse rate had been frequent and its character had been weak. Meteorism had soon been noticed and the abdomen had become tender to the slightest pressure. On opening the abdomen a loop of duodenum had been found ecchymosed, distended and paralysed. The stomach had been healthy. Hæmorrhage had occurred into the mesentery and four centimetres had been removed. A branch of the superior mesentery artery had been found thickened and thrombosed. The other vessels of the abdomen including the aorta had shown signs of arterio-sclerosis. The patient had progressed satisfactorily for twelve days and had died suddenly after another attack of pain.

Renal Calculus.

DR. M. GRAHAM SUTTON showed skiagrams and specimens and read the clinical notes of a patient who had suffered from renal calculus. The patient was a male, aged forty-two years, who had complained of dull aching pain in the right loin. The pain had been worse when the patient was standing or moving about and had been relieved by a night's rest. There had been no colic and no nocturnal frequency of micturition. The right kidney had been enlarged and tender. The urine had been turbid, its specific gravity had been 1018 and its reaction acid. It had contained a moderate amount of albumin, abundant pus and a few bacteria. X-ray examination had revealed the presence of a large stone in the right kidney area in addition to several smaller ones. A shadow had also been present in the region of the right ureter. In order to determine whether this shadow was caused by a stone or by a phlebolith an opaque catheter had been inserted into the ureter and pyelograms taken after the injection of sodium bromide. No dilatation of the ureter had been found. Cystoscopical examination had revealed that trigonitis was present and that the right ureteral orifice was inflamed and slightly open. The left side had been normal. Specimens of urine had been secured by ureteric catheterization on each side. On the right side the urine had been turbid, the reaction had been neutral, the specific gravity 1012, it had contained a moderate amount of albumin and abundant pus and bacteria. The urea content had been 0.55%. On the left side the urine had been clear, its reaction had been neutral and its specific gravity 1025. It had contained no albumin, pus or bacteria and the urea content had been 3.35%. It had been decided that no stone was present in the ureter because of: (i.) The absence of a history of colic, (ii.) the absence of a bulging or stone presenting at the intravesical portion of the right ureter, (iii.) the easy passage of the ureteric catheter and (iv.) the absence of hydroureter. At subsequent operation several stones had been found in the kidney and a catheter had been passed freely down into the bladder. Convalescence had been normal.

Work of the Red Cross Society.

DR. J. LOCKHART GIBSON showed a specimen of a sleeping mat made by the Handicraft Section of the Red Cross Society.

Ear, Nose and Throat Conditions in Children.

DR. WALTER CROSSE read a paper entitled: Notes Upon Tonsils, Adenoids and Some Middle Ear Infections in Childhood (see page 263).

DR. A. JEFFERIS TURNER said that he did not know how adenoids could be prevented or cured except by removal. He divided patients with adenoids into four groups. Group I. contained children with obvious nasal obstruction who were mouth breathers. Group II. contained those who were not mouth breathers, but often suffered more than those of Group I. They could be detected by examination of the chest, but the condition found varied from a slight pinching in to a definite pigeon-breast condition. Group III. contained those with ear trouble and Group IV. was the rarest of all. Patients belonging to this group were always making grimaces and were frequently regarded as suffering from chorea. This type of condition was apparently reflex in origin and was due to irritation. It always occurred in a very nervous type of child. The movements were confined to the face and never extended to the limbs. A permanent cure resulted after removal of the adenoids. He had only seen one failure and this had been due to adhesions between the Eustachian tube and the back wall of the pharynx. Removal of these adhesions had brought about a cure. Dr. Turner said that he did not believe in making a digital examination of the back of the throat, for it only made an enemy of the child and was not necessary if a good history were taken. He found great difficulty in deciding whether or not a tonsil was septic. He would like to have more information regarding the removal of tonsils in children after one or more attacks at long intervals. Regarding the time of operation for adenoids he was disinclined to operate on children under two years of age, though it was often difficult to make a decision in the matter.

DR. E. CULPIN considered that adenoids should be looked for at any age and, if present, removed. The youngest patient on whom he had operated, was aged two weeks. It was very important in removing adenoids to keep the curette in the mid-line in order to avoid damage to the Eustachian cushions. He was opposed to exploring with the finger after the use of the curette, as this practice was sometimes followed by *otitis media*. The persistence of a catarrhal condition after the removal of tonsils and adenoids might be due to bands of adhesions, but was more commonly due to sinus trouble. Hæmorrhage was seldom troublesome in children compared with adults, probably a general and not a local anæsthetic was used as in the case of the latter. To prevent it he removed all clots from the bed of the tonsil. He referred to the necessity of the guillotine being blunt and not sharp. When adenoids were present in patients with *otitis media*, they ought to be removed. After paracentesis he did not place cotton wool in a discharging ear, but inserted a drain. He considered that chloroform was much better than ethyl chloride for the production of anæsthesia in children when tonsils and adenoids were to be removed.

DR. S. F. MCDONALD said that the most suitable age for operating on patients for the removal of tonsils and adenoids depended entirely on the symptoms. Thorough removal of the tonsils was necessary. He considered that when more than one child in a family required operation, it was advisable to operate on them at the tame time.

DR. J. LOCKHART GIBSON said that he would like to have heard Dr. Crosse place more stress on the importance of daily Politzerization after puncturing or incising the membrane of an acutely inflamed middle ear. He considered it essential for good drainage of the middle ear and antrum and it insured success and good hearing.

DR. CROSSE in reply thanked the members for the way in which they had received his paper. He said that the diagnosis of a septic tonsil was made easy by the expression of the supra-tonsillar fossa. This frequently resulted in the exudation of a considerable amount of *débris* and secretion. There was no definite limit for the removal of adenoids. Ear ache and certainly a running ear were definite indications for the removal of adenoids. Before the insertion of a finger into the naso-pharynx the young patient should be warned and his confidence gained. He preferred the use of ethyl chloride rather than chloroform, for he did not consider the latter safe for the removal of tonsils and adenoids. With ethyl chloride there was a quick recovery and slight risk of inhalation of blood and *débris*. He had seen very severe hæmorrhage after operation in children. Patients should be warned that they might have an acutely inflamed middle ear after the removal of adenoids. The condition soon cleared up. He nearly always used a gauze drain and not cotton wool after paracentesis. He always used Politzerization for both adults and children if they were deaf after adenoid removal.

Ophthalmology and the General Practitioner.

DR. GEORGE THOMSON read a paper entitled: "Some Eye Notes for the General Practitioner" (see page 267).

DR. E. J. MCGUINNESS referred to a point in the differential diagnosis of iritis and glaucoma which had not been mentioned by Dr. Thompson. In glaucoma there was definite anæsthesia of the cornea, while the opposite was seen in iritis. He stated that corneal abrasions were often missed. They could easily be detected by the use of fluorescin. While it was wise to wait, if possible, for a cataract to mature, operation should be performed whenever failing vision prevented a patient from getting about.

DR. E. O. MARKS said that in cases of strabismus quite apart from muscle trouble it was essential to remember that the affected eye would go blind unless the patient were made to use it.

DR. J. LOCKHART GIBSON could only say a few words regarding two or three of the questions raised by Dr. George Thomson. He was delighted to hear him pronounce against the promiscuous use of cocaine. He considered it a very pernicious ingredient in an eye lotion, because it was apt to raise the corneal epithelium as a bleb. The danger of such a bleb rupturing when infective matter was present in the conjunctival sac must be apparent to anyone. He used and preferred cocaine for operative work. Cocaine in an eye lotion had only one advantage. It impressed the patient. He was glad that the importance to general practitioners of distinguishing between glaucoma and iritis had been pointed out. It was not always easy. The large insensitive pupil of acute glaucoma was a great help because the pupil of iritis was never large unless a mydriatic had been used. In distinguishing a mild iritis from a conjunctivitis it was important to be not satisfied with oblique illumination. An ophthalmoscopic mirror would be able to detect a slight irregularity of the iris margin and the use of homatropine, if in doubt, would show the irregular pupil of an iritis. Again it was most important never to tell a patient that he had a cataract without using an ophthalmoscopic mirror. Often a lens looked opaque to oblique illumination and was quite clear to transmitted light. Regarding acute glaucoma, he believed it to be due to excessive secretion of the ciliary gland, just as increased intra-cranial tension was due to increased secretions of the chorioid gland. He looked upon a well performed iridectomy as a cure for acute glaucoma, if done soon enough. The ætiology and treatment of chronic glaucoma were not necessarily the same as in acute.

He was glad to note that those doing general work appreciated the papers. It was a good sign when those engaged in general work were broad-minded enough to take an interest in special work and to learn from it, just as it was important for those engaged in special work to be broad-minded enough to take an interest in and get help from the work of men engaged in general practice.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

MEACLE, NORMAN HARDING, M.B., Ch.M., 1914 (Univ. Sydney), 24, Lang Road, Centennial Park.

PATON, ROBERT THOMSON, M.B., Ch.M., 1923 (Univ. Sydney), Canberra.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

ARRATTA, JOSEPH ANDREW, M.B., 1922 (Univ. Sydney), Rockhampton, Queensland.

BRAY, MABEL IRENE COUSAN, M.B., Ch.M., 1922 (Univ. Sydney), Cassilis.

COLLINS, JOSEPH FRANCIS, M.B., Ch.M ,1922 (Univ. Sydney), 100, Glover Street, Cremorne.

CROSSIN, DAVID JOSEPH, M.B., Ch.M., 1922 (Univ. Sydney), Armidale.

DAWES, SYDNEY ROBINSON, M.B., Ch.M., 1923 (Univ. Sydney), Armidale.

FOX, MARION GALBRAITH, M.B., Ch.M., 1924 (Univ. Sydney), Killara.

HEWITT, GEORGE HENRY, M.B., 1923 (Univ. Sydney), Burwood.

KEYS, RAYMOND ALLISON, M.B., Ch.M., 1924 (Univ. Sydney), Carlton.

MACKERRAS, IAN MURRAY, M.B., Ch.M., 1924 (Univ. Sydney), Zoology Department, Sydney University.

MAIN, ARTHUR WAREHAM, M.B., Ch.M., 1924 (Univ. Sydney), Lane Cove.

MATHESON, WILLIAM HARLOW, M.B., Ch.M., 1923 (Univ. Sydney), Mudgee.

MUNRO, FRANK VIVIAN, M.B., Ch.M., 1924 (Univ. Sydney), Nelson Bay Road, Waverley.

OPIT, LEON, M.B., Ch.M., 1923 (Univ. Sydney), Birrell Street, Waverley.

TAYLOR, HUGH MORRIS, M.B., Ch.M., 1921 (Univ. Sydney), Roseville.

THE undermentioned has been elected a member of the Victorian Branch of the British Medical Association:

PEDLER, ALFRED CYRIL, M.B., 1924 (Univ. Melbourne), Ballaarat Hospital.

THE undermentioned have been elected members of the Queensland Branch of the British Medical Association:

DAY, WILLIAM CHARLES, M.B., 1924 (Univ. Sydney), Brisbane.

SWORD, DONALD CHARLES CAMERON, M.B., Ch.M., 1924 (Univ. Sydney), Brisbane.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned has been registered, under the provisions of the *Medical Act 1915*, as a duly qualified medical practitioner:

MACDONALD, ALAN JOHN, M.B., B.S., 1924 (Univ. Melbourne), 9, Turner Street, East Malvern.

QUEENSLAND.

THE undermentioned have been registered, under the provision of the *Medical Act of 1867*, as duly qualified medical practitioners:

MAIN, JAMES NORMAN, M.B., 1924 (Univ. Sydney), Rockhampton.

MCCULLOCH, JAMES FISHBOURNE, M.B., Ch.M., 1924 (Univ. Sydney), Brisbane.

PARK, WILFRED, M.B., Ch.M., 1924 (Univ. Sydney), Brisbane.

RANKIN, ROBERT LIONEL, M.B., Ch.M., 1923 (Univ. Sydney), Esk.

Medical Prizes.

THE ALVARENGA PRIZE.

MEDICAL practitioners throughout Australia will be glad to learn that the Alvarenga Prize for 1924 has been awarded to Dr. Gordon Cameron, of Melbourne. The Alvarenga Prize is awarded annually by the College of Physicians of Philadelphia for an essay embodying the results of original research in medicine. Dr. Cameron's essay was entitled: "Pancreatic Anomalies: Their Morphology, Pathology and Clinical History."

Obituary.

REUTER EMERICH ROTH.

We regret to announce the death of Dr. Reuter Emerich Roth which occurred at Noumea on September 3, 1924.

Books Received.

AIDS TO PSYCHIATRY, by W. S. Dawson, M.A., M.D. (Oxon.), M.R.C.P. (London), D.P.M.; 1924. London: Baillière, Tindall and Cox; Foolscap 8vo., pp. viii. + 309. Price: 4s. 6d. net.

DISEASES OF WOMEN, by Ten Teachers, under the direction of Comyns Berkeley, M.A., M.D., M.C. (Cantab.) F.R.C.P. (Lond.), edited by Comyns Berkeley, H. Russell Andrews, J. S. Fairbairn; Third Edition; 1924. London: Edward Arnold and Company; Demy 8vo., pp. 641, illustrated. Price: 24s. net.

ELEMENTARY HYGIENE FOR NURSES: A HANDBOOK FOR NURSES AND OTHERS, by H. C. Rutherford Darling, M.D., M.S. (London), F.R.C.S. (Eng.), F.R.F.P.S. (Glasgow); Second Edition; 1924. London: J. and A. Churchill; Crown 8vo., pp. 230 + viii., with 45 illustrations. Price: 5s. 6d. net.

FUNDAMENTAL PRINCIPLES IN TREATMENT, by Harry Campbell, M.D., B.S., F.R.C.P.; 1924. London: Baillière, Tindall and Cox; Crown 8vo., pp. viii. + 477. Price: 10s. 6d. net.

LIFE INSURANCE EXAMINATION, edited by Frank W. Foxworthy, Ph.B., M.D.; 1924. St. Louis: The C. V. Mosby Company; Demy 8vo., pp. 738, with 156 illustrations. Price: $9.00.

MIND AND MEDICINE, by Thomas W. Salmon, M.D., 1924. New York: Columbia University Press; Demy 8vo., pp. 33.

MODERN METHODS OF TREATMENT, by Logan Clendenning, M.D., with Chapters on Special Subjects by various authors; 1924. St. Louis: The C. V. Mosby Company; Royal 8vo., pp. 692, illustrated. Price: $9.00.

OBSTETRICAL NURSING, by Charles Sumner Bacon, Ph.D., M.D.; Second Edition, thoroughly revised; 1924. Philadelphia and New York: Lea and Febiger; Post 8vo., pp. 340, with 126 illustrations. Price: $2.75.

ON THE BREAST, by Duncan C. L. Fitzwilliams, C.M.G., M.D., Ch.M., F.R.C.S. (Ed. and Eng.); 1924. London: William Heinemann (Medical Books) Limited; Royal 8vo., pp. 456 + x., with 166 illustrations and two plates. Price: 30s. net.

PRACTICAL NURSING: INCLUDING HYGIENE AND DIETETICS, by the late Herbert E. Cuff, M.D., F.R.C.S., and W. T. Gordon Pugh, M.D., B.S.; Sixth Edition, Rewritten and Enlarged by W. T. Gordon Pugh; 1924. Edinburgh and London: William Blackwood and Sons; Crown 8vo., pp. 635. Price: 12s. 6d. net.

THE BOYS' WIRELESS BOOK; 1924. Sydney: Cornstalk Publishing Company; Crown 4to., pp. 90, with illustrations. Price: 4s. 6d. net.

THE DIAGNOSIS OF NERVOUS DISEASES, by Sir James Purves-Stewart, K.C.M.G., C.B., M.D. (Edin.), F.R.C.P.; Sixth Edition, Revised; 1924. London: Edward Arnold and Company; Demy 8vo., pp. 648, with 285 illustrations. Price: 30s. net.

THE HISTORY OF THE GREAT WAR BASED ON OFFICIAL DOCUMENTS: MEDICAL SERVICES—GENERAL HISTORY, in four volumes by Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D., and Major T. J. Mitchell, D.S.O., Royal Army Medical Corps; Volume IV., 1924. Edinburgh: His Majesty's Stationery Office; Demy 8vo., pp. 711, illustrated. Price: 25s. net.

Medical Appointments.

DR. ALFRED J. TRINCA (B.M.A.) has been appointed Certifying Medical Practitioner and Referee at Melbourne under the provisions of the *Workers' Compensation Acts*.

* * * *

SIR JAMES WILLIAM BARRETT (B.M.A.) and DR. EDITH HELEN BARRETT (B.M.A.) have been appointed members of the Visiting Committee in the Neglected Children's Depôt, Royal Park, under the provisions of the *Neglected Children's Act* 1915.

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DR. HARRY WYATT WUNDERLY (B.M.A.) has been appointed by His Excellency the Governor of South Australia in Council, to be an Honorary Commissioner to inquire into and report upon matters relating to the treatment of tuberculosis in Great Britain, the Continent of Europe and the United States of America.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

SEP. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEP. 17.—Western Australian Branch, B.M.A.: Branch.
SEP. 17.—South Sydney Medical Association, New South Wales.
SEP. 19.—South Eastern Medical Association (Wollongong), New South Wales.
SEP. 20.—Northern Districts Medical Association, New South Wales.
SEP. 20.—Northern Suburbs Medical Association, New South Wales.
SEP. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
SEP. 24.—Victorian Branch, B.M.A.: Council.
SEP. 24.—Western Medical Association (Wellington), New South Wales: Annual Meeting.
SEP. 25.—New South Wales Branch, B.M.A.: Branch; Election of Members to Federal Committee.
SEP. 25.—South Australian Branch, B.M.A.: Branch.
SEP. 26.—Queensland Branch, B.M.A.: Council.
SEP. 30.—Victorian Branch, B.M.A.: Election of Members to Federal Committee.
OCT. 1.—Victorian Branch, B.M.A.: Branch Meeting; Election of Representatives of Divisions.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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